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# AMERICAN JOURNAL OF OPHTHALMOLOGY

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Copyright 1930, Ophthalmic Publishing Company, 30 North Michigan Avenue, Chicago

Subscription twelve dollars yearly. Single number, one dollar twenty-five cents.

PUBLISHED MONTHLY BY THE OPHTHALMIC PUBLISHING COMPANY

PUBLICATION OFFICE: 450 AHNAP STREET, MENASHA, WISCONSIN

EXECUTIVE OFFICE: 508 METROPOLITAN BUILDING, SAINT LOUIS, MISSOURI

EDITORIAL OFFICE: 530 METROPOLITAN BUILDING, DENVER, COLORADO

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# AMERICAN JOURNAL OF OPHTHALMOLOGY

Volume 13

October, 1930

Number 10

## THEORETICAL AND PRACTICAL NOTES ON GLAUCOMA

DR. CARL HAMBURGER

BERLIN

There is an apparent antagonism between intraocular inflammation and simple glaucoma, and this suggests that the goal to be sought in the treatment of simple glaucoma is the finding of a form of inflammation which can be controlled and limited and yet which renders the eye soft without operation. The author has kept the tension down for prolonged periods of time by cauterizing the cornea near the limbus with silver nitrate sticks. The value of glaucosan in reducing tension in such cases as have proved intractable to miotics is emphasized.

Why is a stork's eye larger than the human eye? (Figure 1.) Why is the orbit of a bird of prey (sparrow-hawk) larger than the cranial cavity? (Fig-

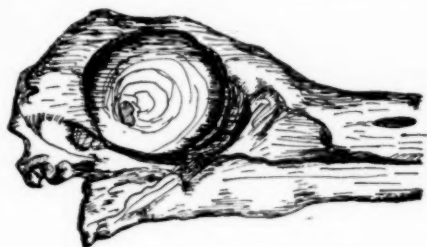


Fig. 1 (Hamburger). Skull of a stork. Notice the enormous orbit. Almost the whole cubic space of the skull is taken up by the orbits. (See the author's work on the nutrition of the eye, published by Thieme, Leipzig, 1914.)



Fig. 2 (Hamburger). Sparrow hawk's skull. The orbit is larger than the cranial cavity!

ure 2.) We know of no mechanical reason and must content ourselves with the teleological one: The laws of life enforce this condition.

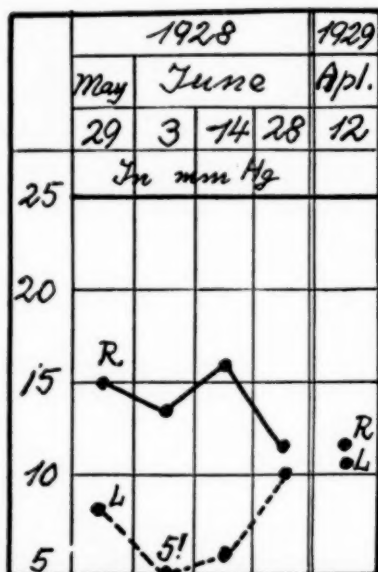
Why, as a rule, does the eye get soft in inflammation (intraocular, ciliary),

whereas nearly all other organs become hard in acute inflammation? (Recall, for example, the hardness of the skin in panaritium.) Is not the eye enclosed in a capsule so that we should expect hardness in acute inflammation (accumulation of fibrin, serum, pus, and blood)? Upon what this paradoxical softening depends we know not; probably upon hypercompensated dehydration of the vitreous. Surely, however, this softening peculiar to the eye is not due to chance, but must be looked upon as something teleological, as a wonderful mechanism of defence, something similar to the reaction of the pupil in sunlight or to the hypertrophy of the heart in valvular disease. Were the eye not to soften, it would be destroyed in every injury or inflammation by glaucoma. For least of all organs can the eye endure increased pressure.

The softening of the eye in inflammation is no law, only a rule, and no rule is without exceptions. Every ophthalmic surgeon knows of cases of iritis involving increased tension. Glaucomatous iritis is, however, no ordinary disease and usually runs a much less severe course than primary glaucoma. To illustrate the great practical importance of this difference (inflammation versus glaucoma—in this case chronic simple glaucoma or glaucoma simplex). I have chosen a few cases which have been under my observation for a number of years.

1. Curve 1 shows the course of an

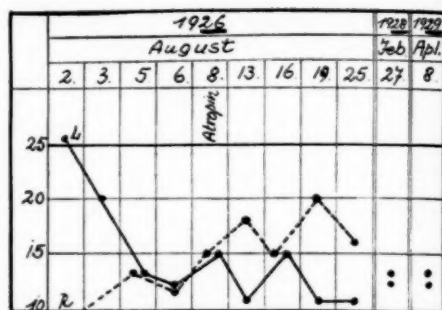
acute monocular iritis in a laborer aged thirty-three years. At the first examination the tension of the highly inflamed and blood-filled eye measured only 8 mm. (!) Schiötz, and five days afterward not more than even 5 mm.; it was soft as a poultice, like an eye



Curve 1 (Hamburger). Emil S., 33 years old. Monocular iritis. Daily examination of tension impossible on account of pain. Tension of affected eye down to 5 mm. Other eye also very soft. After nearly one year both eyes still soft.

in diabetic coma. When healed (June 19) both eyes very soft (10 and 11 mm.). Nearly a year afterwards they were about equally soft (11 and 12 mm.).

2. Curve 2. Iritis in a woman aged sixty-eight years. At the beginning moderate tension (26 mm., July 29, 1926). (Quite often tension rises at the beginning of the inflammation: it naturally takes some time for the wonderful tension-regulating mechanism to set to work.) After leaving off atropin, the tension dropped to 13 mm. within a week, or even to 11 mm., actually less than half the initial tension. After three years (April, 1929) the eyes are still just as soft. In other words, the inflammation has had for a number of years a softening effect comparable



Curve 2 (Hamburger). Mrs. T., aged 68 years. Monocular iritis, left eye, with somewhat increased tension, August, 1926. After omission of atropin tension goes down spontaneously to one-half or less of the previous reading. After three years eyes very soft, 12 and 13 mm. Hg.

with that of a successfully performed glaucoma operation.

3. A woman aged fifty-six years, diabetic, with severe glaucoma simplex (that is, not responsive to miotics) was so lucky, I might say, as to get an iritis of each eye. Thereupon the tension gradually dropped below 20 mm. This case has been under my observation for more than seven years.<sup>1</sup> For the past three years no drops have been instilled, neither miotics nor glaucosan, although the tension has been recorded once or twice every month. No operation could have worked out with greater efficiency than ciliary inflammation did in this instance.

Thus ciliary inflammation may be considered as the softening principle in the treatment of glaucoma, (a) operative and (b) medical. (a) Operative treatment: There are no operations without inflammation<sup>2</sup>, for blood and lymph vessels are always divided and always reunited, and leucocytes and fibrin always appear. Least of all is inflammation lacking in the eye whose mucous membranes the

<sup>1</sup> The curve is shown in my book "Spontaneous cure of hopeless diseases" ("Selbstheilung hoffnungsloser Krankheiten"), published by Gustav Fischer, Jena, 1928 (41 pages). (See American Journal of Ophthalmology, 1929, volume 12, April, page 319.)

<sup>2</sup> A fact emphasized by prominent physicians, e.g. John Hunter in England, Billroth in Austria, and Bier in Germany.



knife must penetrate. (b) Medical treatment: miotics provoke arterial hyperemia with increased metabolism, increase of albumen in the anterior chamber as seen by slit-lamp ("physiological inflammation".) Glauco-san drops act in a similar manner. Although at first anemia results, reactive hyperemia (similar to Esmarch's anemia in the limbs) with increased permeability of the vessels follows, that is, the most important symptoms of inflammation.

If anyone doubts that inflammation implies the softening principle of glaucoma treatment, let me recall the following facts: After many glaucoma operations (Elliot's trephining, Lagrange's sclerectomy, cyclodialysis) atropin is instilled. Rightly so, but imagine using atropin in glaucoma! Atropin, however, is nothing but the remedy to keep the ciliary inflammation in bounds. Adhesions of iris and lens are to be prevented, exudations of pigment must not occur<sup>3</sup>—conditions arising only through inflammation.

Thus the softening principle in the treatment of glaucoma so long sought for has been found clinically. (By the way, Albrecht Graefe used atropin after glaucoma iridectomy.)

The effective principle once known, we can try to imitate it without opening the eye. Do not misunderstand me. I know full well that some glaucoma cases only respond to operation, and sometimes the operation is truly a boon, for patient as well as doctor. But the resolution to operate on an eye

that possesses vision is not easily taken, for unhappily it not infrequently happens that the glaucoma operation does harm instead of helping. According to my experience it is utterly wrong to teach students and doctors that good technique in glaucoma operations will guarantee success. The large number of methods (and every year adds new ones) argues against the certainty of success, in my opinion.

If both eyes have vision, the risk from the operation is not too great; but, if one eye is already blind or if an operation has already been performed without any or with only temporary result, I do not consider it right to stake everything on a single stroke. In such cases we ought to try to provoke an inflammation (capable of being controlled and limited) by cauterizing the cornea (near its border) so that tension is diminished.

**Technique:** The patient lies on the operating table. Anesthesia is produced with holocaine, without supracorneal so as not to dilate the pupil. Fix the eye well. Cauterize the cornea in the upper nasal quadrant with silver nitrate stick after experimenting on animals. An assistant neutralizes with physiological salt solution (cotton pledget.) The cornea immediately becomes white where cauterized, the



Fig. 3 (Hamburger). Showing points at which cornea is cauterized.

white spot being exactly circumscribed. Avoid too violent and too mild cauterization. The cauterized spot has a yellow hue later on. If tension remains elevated, the position of the cauterization leaves sufficient space for operating later, if desirable. To relieve pain use morphine or novalgine.

M. Rosenstein ("Successful treatment of corneal infiltrations by superficial galvanocautery, and curative value of the cautery point in glaucoma". *Medizinische Welt*, 1929, page

<sup>3</sup>Thus Professor Elschnig of Prague (*Klinische Monatsblätter für Augenheilkunde*, 1928, volume 80, page 382) writes that "after nearly every glaucoma operation extensive proliferation of pigment at the pupillary border with adhesion of iris and lens capsule results". "I have seen" (he says) "many cases with extremely narrow pupil nearly closed by proliferation of pigment". Similarly Professor Axenfeld, Freiburg, emphasizes the danger that after trephining extensive posterior synechiae develop, if scopolamin and so on are not used in after-treatment. (Report of Heidelberg Congress, 1912, page 165.) These observations are very important. One cannot understand them unless one knows the softening effect of acute inflammation.

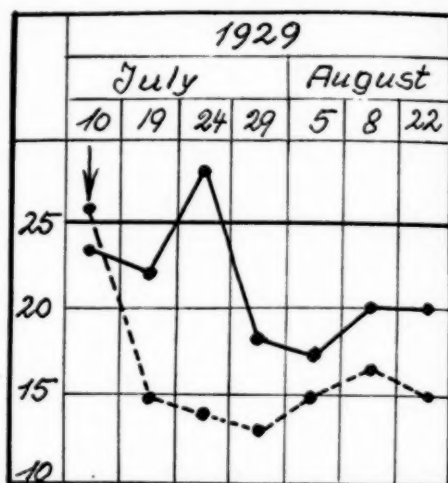
1,145), referring to my publications, gives preference to the galvanocautery method, cauterizing superficially at three or four different points, beneath the upper lid and near the corneal border. "Prompt and striking success. Diminution of tension lasts for more than nine months."

Cauterization may often meet with no success; quite naturally, since the eyes in question are severely diseased. But are glaucoma operations always successful? The following observation shows that cauterization may be useful even if operations have been unsuccessful.

**Case reports:** Merchant aged fifty-three years. March, 1927, iridectomy; April, 1928, Elliot trephining. Since tension nevertheless increased, cauterization with silver nitrate (July 9, 1929). Gradual fall tension to 20 mm. or less. The softening was distinctly discernible until the middle of September, that is, for two months; miotics were not employed during that time, the softening can therefore be only ascribed to the inflammation. (Dr. Eppenstein of Berlin has kindly allowed me to publish this observation.)<sup>4</sup>

Better methods may be sought for and certainly may be found, but the principle cannot be proved more clearly.<sup>5</sup> The following curve (3) also proves that the principle is correct.

Merchant L. aged seventy-one years, almost entirely blind with chronic (simple) glaucoma. Since patient urged



Curve 3 (Hamburger). Mr. L., aged 71 years. Chronic (simple) glaucoma. Cauterized right eye, July 10, with silver nitrate stick in ciliary region of sclera (not cornea), above and below, after dissection of conjunctiva as in Elliot's trephining, with final suture. Tension reduced by one-half.

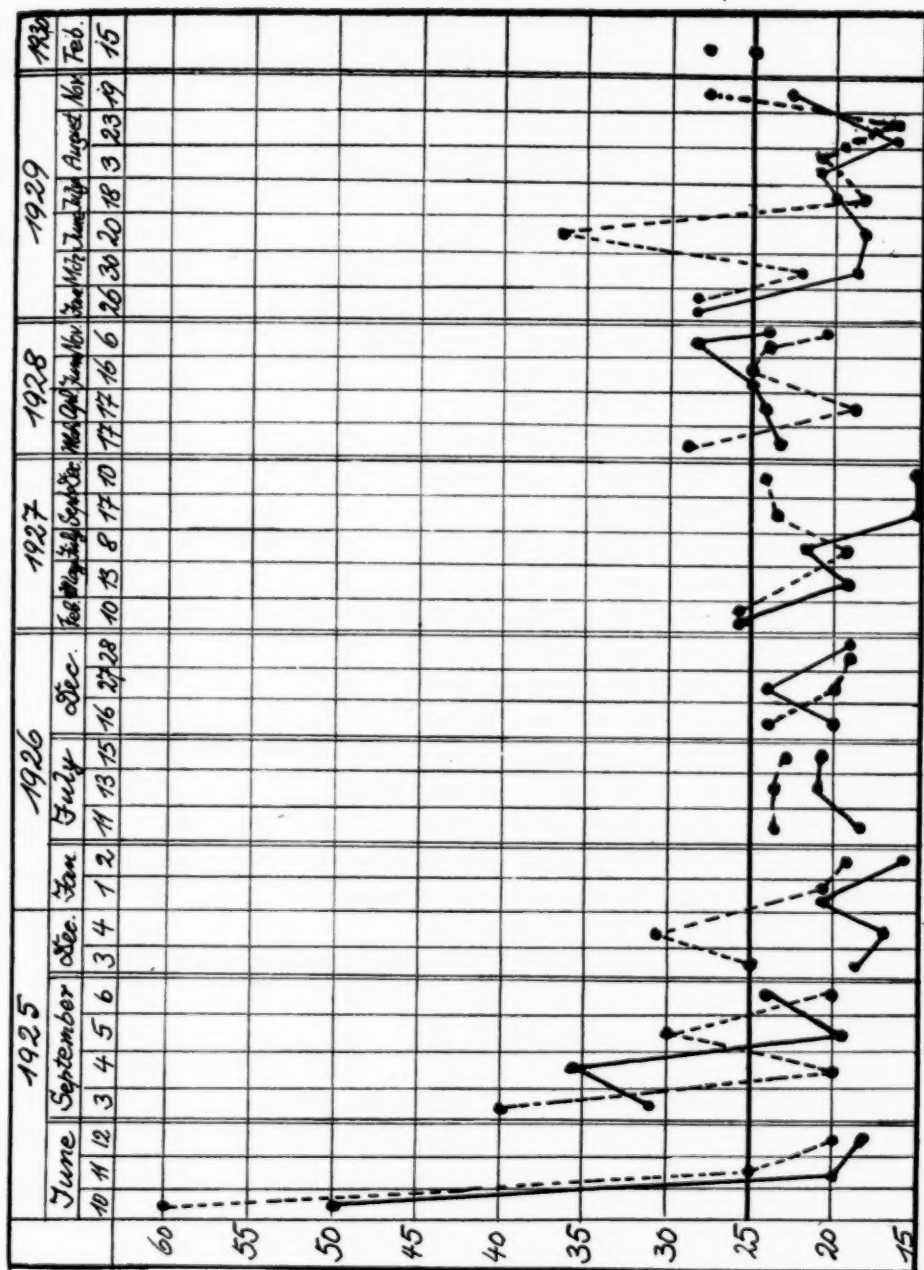
me to make another attempt, I cauterized (silver nitrate stick) the sclerotic in the ciliary region, at two places, above and below, with three applications, after dissecting the conjunctiva as in Elliot's trephining. Tension was reduced by one-half.

Of more practical importance is the treatment with glaucosan drops. I only employ them if miotics prove useless. I consider it very significant that miotics which were previously ineffectual become effective again after glaucosan. This fact is also emphasized by Duke-Elder and Law (British Medical Journal, March 30, 1929, pages 590-592). "It appears, however, that in conjunction with eserine a good effect can be produced in a case where eserine alone has remained ineffective".

A disadvantage of glaucosan treatment is the occasionally ensuing rise of tension. As a rule the latter recedes entirely, and later on the tension is usually much lower. The best way of treating this rise of tension is by eserine, 0.5 percent, further by injection of 10 c. c. of 10 percent sodium chloride solution in a vein of the arm, and, if need be, by subcutaneous in-

<sup>4</sup>W. Feilchenfeld of Berlin (see *Klinische Monatsblätter für Augenheilkunde*, 1930, volume 84, page 414) reports the following cases: Iridocyclitis following operation for cataract; marked rise of tension. Cauterization (evidently of the cornea near its border) with silver nitrate stick. After the cauterization tension down permanently (evidently by transformation of the chronic inflammation into an acute one). In another case (acute glaucoma) tension fell after cauterization from 90 mm. (!) to 35 mm. (!), though staying there for a week only. (Then iridectomy, successfully, vision 6/8.)

<sup>5</sup>Professor Heine of Kiel reported at the Amsterdam Congress (1929) that after wearing contact glasses the eyes were much softer, the same being true of eyes with glaucoma. This, I conclude, is due to the considerable irritation caused by the foreign body.



Curve 4 (Hamburger). Architect L., 53 years old. Chronic (simple) glaucoma of both eyes. Under treatment since June, 1925. Patient not living in Berlin, Mrs. L. learned tonometry, and administered glaucosan drops as soon as the tension, in spite of miotics, was higher than 25 mm. For 1925 the chart shows only occasional tests, because of lack of space; from 1926 on, all tests taken by author are given. Mrs. L. measures tension twice weekly.

Notice beginning and end of chart (nearly five years). At the end, rise of tension is very exceptional. Vision and visual field are the same as in the beginning of the treatment.

jection of morphine. Also a bleeding might prove very effective.

It is better to prevent these attacks according to the suggestion of the American ophthalmologist Sanford Gifford of Chicago. Gifford expressly states that the occasional attacks following glaucosan drops (levoglauco-san)\* should not be regarded as discouraging, for the value of this treatment is "considerable and definite". He instils eserine twice at an interval of five minutes; then glaucosan drops several times every fifteen minutes; then again in the course of two hours eserine every fifteen to twenty minutes.

I only treat one eye at each consultation, never both eyes on one day, especially when I do not know the patient. One proceeds with particular caution (if it is the only eye left and if it is the first consultation) in giving glaucosan drops only once in order to see how the patient reacts. I do the first instillation at the clinic, or else I insist upon the patient remaining under supervision for several hours until the pupil has contracted again.

Sanford Gifford (*British Journal of Ophthalmology*, October, 1929, page 481) says that "glaucosan is of value especially in simple glaucoma and by its means tension may be kept normal for considerable periods in certain cases". Dohrmann K. Pischel of San Francisco reports very interesting examples (*American Journal of Ophthalmology*, 1928, September, pages 705-709). Dr. Haitz of Mainz (*Klinische Monatsblätter für Augenheilkunde*, 1929, page 937) writes: "A patient has refused operation. Under glaucosan his better eye has kept invariably well for two years and a quarter; whereas the other, operated on before, has been getting slowly worse (enlargement of scotoma)."

\*As a rule the application is done by means of drop-ampoules; every ampoule containing the amount required for one administration. For clinics the comparatively cheaper preparation in 5. c. c. bottles is preferable, though these have to be kept cold and well stoppered and should be used up within a fortnight after opening. (Manufacturer: Chemische Fabrik Woelm, Spangenberg bei Kassel, Germany.)

I myself have under observation a patient whose vision and visual field have remained steadily good under alternate instillation of glaucosan and miotics, for the past five years, although the patient came under my treatment (June, 1925) with large scotomas already extending nearly to the middle of the field. Who likes to operate on such cases? (Chart 4.)

Glaucosan drops are valuable also in cases of acute iritis in which the synechiae are so firm that atropin and scopolamin are unable to tear them apart, and in the comparatively rare cases in which iritis involves increased tension. In such cases operative procedures should not be hurried. Thus Professor Stock of Tübingen writes: "Such glaucomas the eyes can overcome without much harm". The article of Ellett and Rychener (*American Journal of Ophthalmology*, 1929, page 371) may also be referred to: "We should like to call especial attention to the utility of glaucosan in this class of cases, namely iritis and iridocyclitis with increased tension. It dilates the pupil more effectively than any other drug and without any risk of further increasing the intraocular tension".

### Summary

I endorse the words of Gifford, in the paper mentioned above: "All methods of treatment demand careful watching of the vision, fields and tension, so that the progress of the disease may be noted early enough for effective surgical intervention". That is the present state of our knowledge. But since simple glaucoma and inflammation—broadly speaking—are antagonistic conditions, that is, since in spite of some exceptions inflammation (acute, ciliary) diminishes tension, science must unceasingly endeavor to find a form of inflammation capable of being controlled and limited and which renders the eye soft without operation. For operating on an eye with vision always involves great responsibility. The goal is not yet won, but the way leading to it is indicated.

21 Händelstrasse, Berlin.



## CENTRAL AND PARACENTRAL HOMONYMOUS HEMIANOPIC SCOTOMAS

OTTO BARKAN, M.D., AND HANS BARKAN, M.D.

SAN FRANCISCO

The two cases here reported showed paracentral homonymous hemianopic scotomas with involvement of the macular region of one eye in the first case and of both eyes in the second. This type of disturbance has not hitherto been recorded in nontraumatic cases. As to life, the prognosis is variable in accordance with the etiology. Prepared for but not read before the Section on Ophthalmology of the American Medical Association, July, 1929.

The central and paracentral homonymous hemianopic scotomas are among the most interesting visual disturbances of cerebral origin. Not only do they cause a characteristic disturbance of reading vision without reduction of visual acuity, and are, therefore, easily missed by the examiner, but their theoretical bearing on the question of the distribution of the macular fibers in the tracts and cerebral cortex renders them most important. Homonymous hemianopic scotomas which include the macular region (true "central" homonymous hemianopic scotomas) have up to the present been observed only as the result of traumatic destruction of the posterior poles of both occipital lobes. A series of such cases was observed in the World War by Holmes and Lister<sup>1</sup>, Axenfeld<sup>2</sup>, and others, and, on the basis of the location of the gunshot wounds and exploratory operations, the gross localization of the macular region was concluded to be at the apex of each occipital lobe.

We have been unable to find a record in the literature of a true central homonymous hemianopic scotoma (with involvement of the macula and reduced central vision) as the result of a nontraumatic lesion. This is not surprising, as such a scotoma can be caused only by a bilateral occipital lesion. Several nontraumatic cases have, however, been described which exhibit paracentral homonymous hemianopic scotomas (so-called central homonymous hemianopic scotomas, not including the macula and which we feel should therefore be designated as paracentral homonymous hemianopic scotomas). These are characterized by their total-

ity for white test objects, their congruence, their small size, and the fact that they never include the whole macular region. They may extend practically up to the point of fixation, and it is this fact which renders them troublesome in reading.

Posey<sup>3</sup>, in his report of such a case in 1908, notes that Mills<sup>4</sup>, in 1898, would seem to have been the first to call attention to macular hemianopia.

Posey<sup>5</sup> refers to two cases of this condition which he has observed personally. He says: "Elsewhere I have recorded two interesting cases which seem to indicate that a very limited lesion of the cortical area for word-vision, or of the tract leading to it from the lower macular center, might cause a loss of vision for one-half of a word, which might be termed hemianopic amblyopia. One-half of the central field is obscured or lost, the peripheral field being maintained, or it may be partially obscured. The patient is half blind for words. A word of more than four or five letters will only be half seen, at at least will be partially cut off, unless the patient turns his eyes so that the unimpaired half of the central field can take in different parts of the word in succession".

Wilbrand<sup>6</sup>, in 1907, summarized an analysis of eight cases observed by him as follows: Macular hemianopia comes on suddenly, usually without accompaniment of other cerebral symptoms, central vision and color sense being normal and the peripheral field of vision unaffected. There are no ophthalmoscopic changes. Central vision is normal. The scotomas, which are negative, are very small and paracentral, being



generally unobserved in distant vision. Great difficulty, however, is experienced in reading, especially of fine print. For in the act of reading, as Willbrand points out, the first details of the letters must be recognized. Thus, in ordinary reading, the initial letter of the first line is fixed directly, the rest of the word and perhaps the word following being seen by indirect vision. As soon as this impression is received, the eyes spring to the right and another initial letter is fixed directly, and what follows to the right, indirectly. When the end of the line is reached, the eyes make a longer jump to the left, beginning a new line below. Movements to the right are fewer when the subject is able to comprehend more words in anticipating the sense of the text. When in macular hemianopia the scotomas lie to the right, there is difficulty in indirect vision and every syllable of each word must be painfully fixed; when, on the other hand, the scotomas lie on the left of fixation, there is great difficulty in finding the beginning of each line. When the letters are small, short words and letters disappear entirely.

As to etiology, in two of his cases the probability of emboli was to be considered because of the presence of mitral and aortic insufficiency. In other cases, circumscribed, septic encephalitis and syphilitic disease of the vessels with thrombosis were possible causal factors. In another case, the cause of the hemianopia appeared more direct, for in this instance a small iron screw, which projected about 13 mm. above the level of its support, penetrated a woman's skull in the region of the left visual center. When the thickness of the scalp and the skull was considered, only a very shallow penetration of the skull cavity was possible.

Why do the paracentral homonymous hemianopic scotomas never include the macular region of the field? The macular overlap or "Ausspärung" has been offered as an explanation; according to Wilbrand and Henschen's theory of the bilateral cortical representation of the macula, which in modified form is supported by

Lenz<sup>7</sup>, the macular region of the healthy side overlaps or masks the scotoma which would be left by the destruction of the macular region of the affected side. Indeed, it has been suggested that one cortical macular region might be destroyed and this not be evident to either subject or examiner because of its being masked by the other side. Hirschberg and Schweiger explained the macular overlap as the result of a simple crossing of the fibers of the retina over the vertical meridian of the visual field. Rönne<sup>8</sup> suggests that when a hemiambyopia is sufficiently intense, the function in the peripheral field may be so depressed as not to respond to the ordinary perimetric tests, whereas the macula, whose function is far superior to that of the periphery, may still respond. The result would be that the visual field would exhibit a constant macular overlap or "Ausspärung". Monakow's hypothesis of the diffuse representation of the macula in the occipital cortex would seem to have been disproved by the experiences of the late war and by Wilbrand's case of a circumscribed injury with a screw.

The present view of leading authorities on the subject is that the clinical facts can be explained only by the existence of an exact and symmetrical anatomic projection of the retina in the optic tracts, external geniculate bodies, optic radiations and occipital cortex, the dorsal portions of the retina corresponding to the dorsal parts of the pathway mentioned and to the dorsal lip of the calcarine fissure, and vice versa. It is also believed that there exists a bilateral cortical representation of the macula of each eye, a cortical macula which is situated near the pole of each occipital lobe, and is probably favored with a separate, especially advantageous, blood supply. Thus would nature tend to safeguard the preservation of the all-important principle of central vision in the human being.

Brouwer and Zeeman<sup>9</sup> are at the present time attempting an exact localization of the representation of the retinal macula in the brain by making small lesions in the retinas of monkeys and

studying the secondary degenerations in the optic nerve, chiasma, optic tracts and geniculate bodies. They conclude from their experiments on the primary optic neurons that the macular fibers have also a large distribution in the second optic neuron. These macular fibers come into contact with far more cells of the external geniculate body than the fibers arising from the peripheral parts of the retina. From their observations of the primary optic centers, they expect to find that the macula has a large but localized projection on the area striata of the cortex.

The question will probably be further elucidated when the late results of the occipital gunshot wounds of the war can be correlated in years to come.

### Report of cases

We are reporting two cases which present certain features that have not been hitherto observed, and for which none of the existing hypotheses seem to offer a satisfactory explanation. Case I certainly provides an observation of fact which seems to stand in contradiction to any present hypothesis.

**Case 1.**—G., a man, aged sixty-five years, whose general health had always been good, was given a prescription for glasses, December 2, 1922, the corrected vision being R. 10/10 and J. 1; L. 8/10 and J. 1. December 5, at 4:30 p. m., the patient returned complaining that the left lens was unsatisfactory. Vision was R. 10/10 and J. 1; L. 4/10 and J. 3. In the course of the next half hour, vision of the left eye became reduced to counting fingers at six feet. There was no vertigo or any other symptom whatever. On being questioned, the patient, an intelligent and prominent man in the community, stated that twenty years before he had had a hemiopia (side unknown) which a New York ophthalmologist had called a spasm. It had cleared up in the course of three weeks.

The visual fields of the patient (fig. 1) showed a paracentral, practically congruous, homonymous hemianopic scotoma, absolute for 5 mm. white disc, and extending to within ten degrees of

the fixation point. The absolute scotoma was surrounded by an area of relative defect (absolute for 5 mm. red disc). There was a quadrant defect absolute for red 2 mm. disc with diminished loss of function in its periphery, that is, relative for 2 mm. red disc. Except for moderate sclerosis of the retinal vessels, the ocular conditions were found normal. Dr. C. M. Cooper, who referred the patient, reported physical examination as essentially negative. Lumbar puncture was not done. The patient has remained in good health up to the present time and vision is 10/10 in each eye. The field defects are practically unchanged, except that the area of relative defects appears smaller and no longer includes the macular region of the left eye. There is no longer any difficulty of vision, or trouble in reading.

A summary of similar cases is recorded by Wilbrand and Sanger.<sup>10</sup> They were probably due to thrombosis or embolism in or beneath the occipital cortex. A few cases have been observed of a quadrant hemianopia retracting down to a homonymous hemianopic paracentral scotoma in the course of years, and vice versa a homonymous hemianopic paracentral scotoma has been observed to enlarge and approximate a quadrant defect. In our opinion, the question arises whether some of the cases of pure paracentral homonymous hemianopic scotoma reported in the literature would not have shown some involvement of the affected quadrant if examination had been carried out with sufficiently small colored discs, as was done in both of our patients.

The striking feature of this case remains to be mentioned; namely, the inequality of vision in the two eyes, which was due to the asymmetry of the field defects, that is, to the involvement of the macular region of the field of the right eye, whereas the macular region of the left eye was intact. Axenfeld<sup>2</sup> reports a war injury showing a slight asymmetry of a paracentral homonymous hemianopic scotoma. Pagenstecher<sup>11</sup> also reports a case of asymmetry during the war, but both these

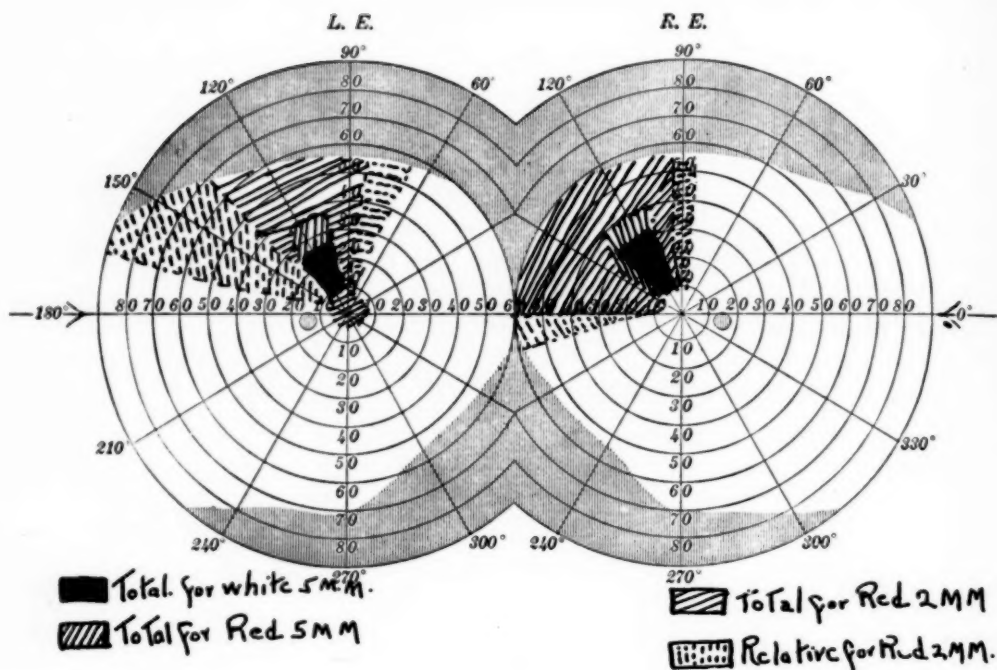


Fig. 1 (Barkan). Visual fields, case 1, December 12, 1922.\*

authors concede that the asymmetry observed was probably due to multiplicity of injury. Present conceptions of the physiology and anatomy of the cortical macula apparently fail to afford a satisfactory explanation of our case, unless one resorts to the highly unsatisfactory assumption that the anatomic substrate in our patient exhibits an anomalous condition. Is an individual exception to the accepted rule of such an important functional organization probable?

**Case 2:** C. L. L., a man, aged sixty-eight years referred by Dr. D. N. Irwin, with symptoms of marked cerebral sclerosis, December 1, 1926, had complained of misfit glasses six weeks before, the distance vision being slightly blurred, and stated that he could no longer read with comfort. He had had spells of "hazy" vision on and off for ten years. The spells, which at first

had occurred only once or twice a year, had recently increased in frequency to once or twice a week and occasionally to several times a day. He had never to his knowledge had a hemianopic defect. These spells of "hazy" vision were accompanied by an unstable feeling and a tendency to lurch (as he believed) to the left. His wife stated that he tended to walk to the right. Six months earlier he had had a spell at the theater. He had closed his eyes momentarily and on reopening them saw the stage tilted to a vertical position. Three months earlier he had had a spell of slight vertical diplopia of short duration. At the time he was referred to me, when looking at an object (a chandelier) with either eye, the patient observed that it had a tendency to move toward the right. Vision right and left with correction was 6/10 J. 1 with difficulty. Except for rather marked sclerosis of the retinal vessels, the ocular conditions were normal in every respect. The visual fields (fig. 2) showed paracentral homonymous hemianopic scotomas, practically congruent, and absolute for 1 mm. white disc on the perimeter.

\* Note: The "relative for 2 mm. red area" should not be charted beyond the peripheral limit of the red field. It was however so charted here in order to denote the extension of the relative values of the different central segments to the periphery of the form field.

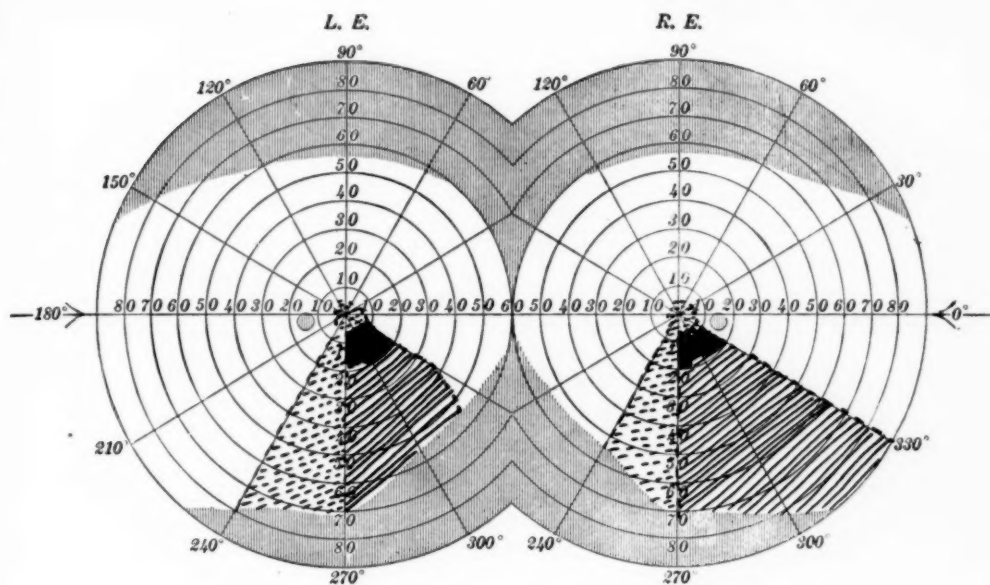


Fig. 2 (Barkan). Visual fields, case 2, January 25, 1926.

There was a quadrant amblyopia for colors (red 2 mm. and also red 10 mm.), which included the macular region of both fields. Figure 3 gives an enlarged picture of the scotomas as taken on the Lloyd stereocampimeter.

The field defects in this case are similar to those in case 1. (Note that the absolute scotoma in both cases extends to within a few degrees of the point of fixation, 10 degrees in case 1 and less than 5 degrees in case 2, but does not

include it.) The relatively preserved macular region exhibits a shape similar to that of the typical macular "Ausparung", or overlap. In case 2 the homonymous amblyopia for red includes the macula of both fields. This, it would seem, has never before been observed in nontraumatic cases. According to the traumatic cases of Holmes and Lister, this would denote an involvement of both occipital lobes.

The explanation of case 2 therefore

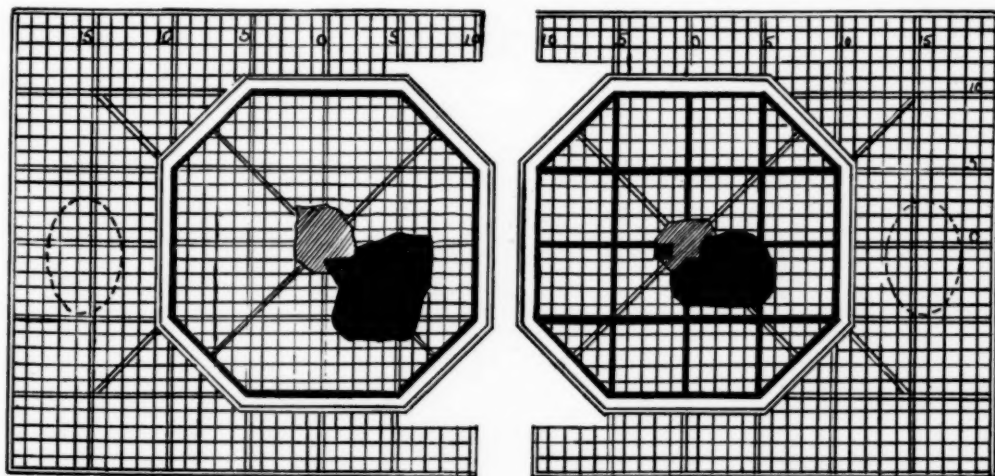


Fig. 3 (Barkan). Scotomas, case 2.



also offers considerable difficulty according to existing theories. Must an individual exception to the rule of the bilateral representation of the macula in the cortex again be assumed? A simultaneous bilateral thrombotic or embolic involvement of the cortical macular areas seems most improbable. It is possible, however, as simultaneous bilateral hemianopias have been recorded in the literature and we ourselves were able to observe quite recently, and prove by autopsy, a case of simultaneous bilateral hemianopia which resulted in amaurosis, the consequence of bilateral simultaneous thrombosis.

### Comment

Our two cases, then, show paracentral homonymous hemianopic scotomas with involvement of the macular region of one eye in the first case and of both eyes in the second. This has never before been observed in nontraumatic cases. A bilateral lesion may explain the second case, but the asymmetry of

the macular involvement in the first case remains a baffling mystery.

In general, the visual defects do not improve with time, although in our first case improvement took place. As far as life is concerned, the prognosis is variable according to the etiology. Such a defect may not only be the precursor of further trouble for many years, but may also usher in other cerebral malacic processes. Patient 1 is well today and occupies a leading position in the community. Patient 2 died during sleep two months after our last observation. Autopsy was not obtainable.

It is our hope that this paper will call the attention of our confrères who are interested in the scientific explanation of medical problems to the need of diagnosing these cases, and that in the course of time it will be possible to accumulate case reports with autopsy observations which will disclose the anatomic basis so urgently needed for these most interesting phenomena.

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# STUDIES IN PERIMETRY: 4, PRELIMINARY WORK ON A DIAGNOSTIC SCALE FOR THE FORM FIELD WITH A 0.17 DEGREE STIMULUS

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Using a stimulus subtending a visual angle of 0.17 degree, the reduction in the field as compared with that obtained for a one-degree stimulus was greater for the presbyopic group of subjects and less (in the order named) for the myopic, hyperopic, and emmetropic groups. The shape of the field obtained for the 0.17-degree stimulus differed from that obtained with the larger stimulus, the reduction being greater on the temporal side. A greater range of scatter was obtained in the results with the 0.17-degree stimulus, and this fact may render of little or no value the use of the smaller stimulus for refinement of diagnosis based on size of field.

A previous paper pointed out the need for increasing the diagnostic sensitivity of perimetry and scotometry when the form field stimulus is used, and methods were proposed for producing this increase of sensitivity. It was noted that a decrease in the visibility of the stimulus should certainly facilitate the detection of an incipient Bjerrum scotoma, Seidel's sign and other faint scotomata, regional cuts, sector-shaped indentations, Rönne's nasal step, and all pronounced irregularities in the shape of the field.

As convenient and feasible means of securing stimuli of low visibility, the following procedures were suggested: decrease in the size of the stimulus, decrease in the difference in coefficient of reflection between stimulus and background, decrease of intensity of illumination, and the combination of any two or all three of these procedures.

It was noted also that, while the usefulness of stimuli of low visibility was obvious and self-evident for the early detection of these localized defects in the field, an advantage for diagnosis on the basis of change in size of field could not be predicted without further study, because of probable compensating influences exerted by decreasing the visibility of the stimulus. (a) The increased sensitivity produced for pick-

ing up individual differences by decreasing the visibility of the stimulus should tend toward a wider scatter in

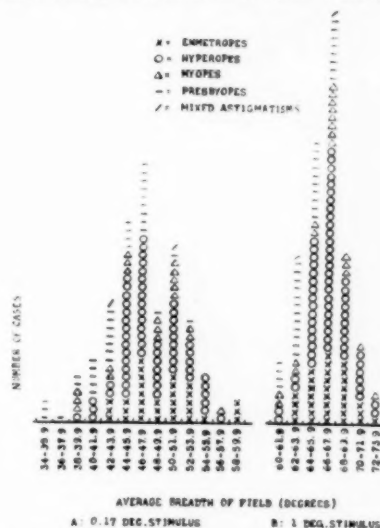


Fig. 1 (Ferree, Rand, Monroe). Average breadth of field; showing the distribution for 150 nonpathological cases. The observers for this and the following charts were selected to include cases of emmetropia, hyperopia, myopia, presbyopia, and mixed astigmatism. The distribution is based on the average breadth of field in the eight principal meridional quadrants. Average breadth of field in degrees is plotted on the horizontal coordinate, and number of cases on the vertical coordinate.

the results obtained for both pathological and nonpathological cases, which increases the liability to an overlap. (b) The greater contraction of the field produced in pathological cases by decreasing the visibility of the stimulus should tend toward a wider

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separation of the two classes of result. Whether the use of stimuli of low visibility can be recommended for sensitizing this diagnostic aspect of field study depends upon which of these two

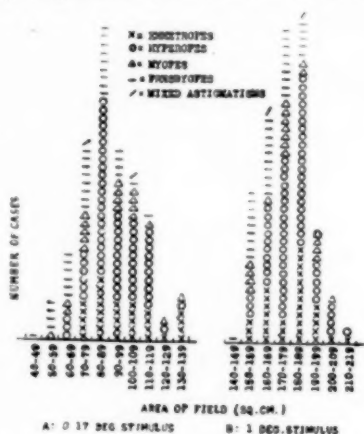


Fig. 2 (Ferree, Rand, and Monroe). Area of field; showing the distribution for 150 nonpathological cases. The fields were mapped to a scale of 12 mm. to 10 degrees and the area measured with a planimeter.

tendencies is found to be predominant in the study of a large number of cases.

The contribution of a part of this information, namely the data to be compared with those obtained from patho-

study. (a) We wished to find out whether the use of stimuli of low visibility increased the sensitivity for picking up individual differences, and whether this result led to a greater scatter in the results, as might be expected. In order to do this the fields for the 150 observers were obtained for two sizes of stimulus, 0.17 degree (a 1 mm. stimulus at 33 cm.) and one degree. (b) We wished to obtain results which would serve as a tentative scale for the use of the 0.17 degree stimulus. We have found that the scale formed for the results of 200 cases for the one degree stimulus serves a very useful purpose as a standard of reference in diagnostic comparisons.

**Conditions under which the work was done:** In the first paper of this series data were presented showing the range of variation of the size of the form field for 200 nonpathological cases when a stimulus subtending a visual angle of one degree was used and the illumination was kept constant at seven foot-candles at every point investigated. In this work careful control was exercised over all the external factors affecting the results of the determination. But with reference to the factors

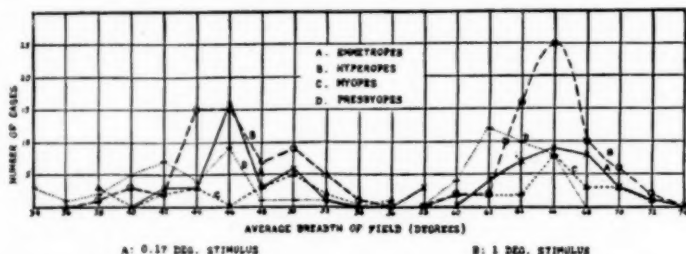


Fig. 3 (Ferree, Rand, and Monroe). Showing the distribution of 150 nonpathological cases for each refraction group in the form of frequency curves: A, emmetropes; B, hyperopes; C, myopes; D, presbyopes. The distributions are based on average breadth of field in the eight principal meridional quadrants.

logical cases as to overlap and other points of importance to diagnosis, has served as one of the incentives for making the present study of 150 nonpathological cases. The required data for nonpathological cases will have to be secured from later work.

Two other incentives have led to this

which influence the results from individual to individual, the selection of cases with two important exceptions, namely, condition of refraction and age, was left entirely to chance. This was done because of the lack of definite knowledge of their relative importance. In the group of observers were included

cases of emmetropia, myopia, hyperopia, presbyopia, and mixed astigmatism. The range of age was from eight to fifty-six years. For convenience of comparison an index had to be chosen to represent size of field. Two types of index were used, the average breadth of field in the eight meridional quadrants and the area of field mapped on a scale of 12 mm. to 10 degrees, measured with a planimeter. The results obtained were plotted in the form of graphs showing the frequency of distribution of cases around a mid or median value. From an inspection of these graphs can be determined therefore the widest, narrowest, and average size of field for all or any of the five classes of observers used, and the size of field that should be regarded as borderline or suspicious, insofar as 200 cases can be considered adequate for such determinations.

It has been the purpose of the present study to make the same type of determination for a stimulus subtending a

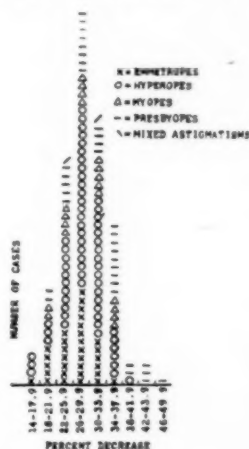


Fig. 4 (Ferree, Rand, and Monroe). Showing for 150 nonpathological cases the distribution of percentage cut produced by using the 0.17 as compared with the 1-degree stimulus.

visual angle of 0.17 degree, using the same observers as were used for the stimulus subtending a visual angle of one degree. For various reasons, however, only 150 of these observers were available. The determinations were made with the Ferree-Rand perimeter.

The stimulus employed was the white from the Hering series of standard papers, coefficient of reflection seventy-eight percent, and the background on which it was viewed was the black of the same series of papers, coefficient of reflection four percent. The de-

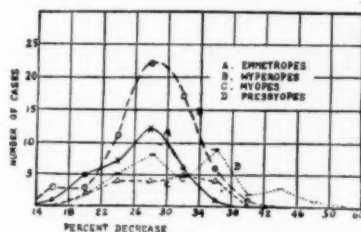


Fig. 5 (Ferree, Rand, and Monroe). Showing in the form of frequency curves for each refraction group the distribution of percentage cut produced by using the 0.17 as compared with the 1-degree stimulus: A, emmetropes; B, hyperopes; C, myopes; D, presbyopes.

terminations were made in the eight principal meridional quadrants (0, 45, 90, 135, 180, 225, 270, and 315 degrees). Ample rest periods were allowed between observations. Each determination was carefully checked, but the observers were not given extensive preliminary training. Care was taken not to include in the series the results of any observer showing a pathological condition by objective examination. As in previous studies the cases were selected by the best experts on the clinic staff.

The results may be considered to represent a fair sample of the form field that may be expected from an average group of observers showing no pathology when the work is done under the conditions described above. These conditions with regard to the number of meridional quadrants selected, the preliminary training of the observers, the time consumed in making the examination, and so on, were intended to approximate more nearly those of the clinic than of the laboratory.

**Results:** The eyes examined included 63 cases of hyperopia and hyperopic astigmatism, 19 cases of myopia and myopic astigmatism, 34 cases of presbyopia, 2 cases of mixed astig-

matism, and 32 cases showing no error of refraction or an error no greater than 1 diopter of hyperopia or 0.25 diopter of hyperopic astigmatism. This latter group contained no cases of myopia or myopic astigmatism, and for convenience of treatment it will be referred to as emmetropic. The range of age was from eleven to fifty-six years.

to 58.5 degrees; for the one-degree stimulus 60.3 to 73.1 degrees. For the 150 cases examined the range for the two sizes did not overlap, that is, the largest size of field for the 0.17-degree stimulus was smaller than the smallest size of field for the one-degree stimulus. The two distributions can therefore be shown for comparison side by side on

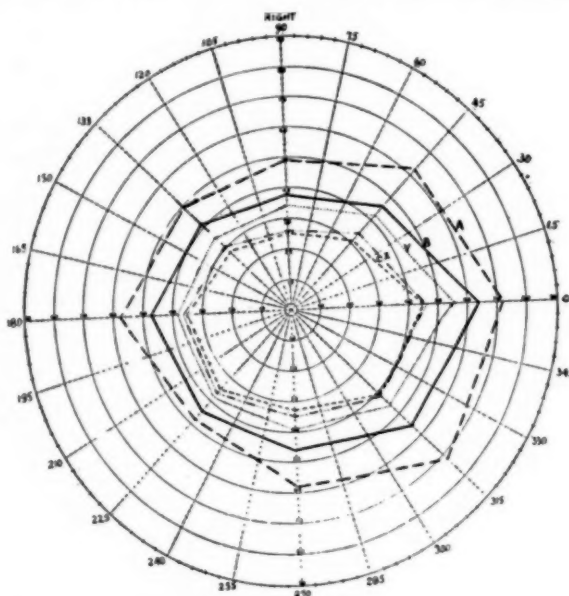


Fig 6 (Ferree, Rand, and Monroe). Showing the widest field, A, for the 0.17-degree stimulus; the average field, B; the narrowest field, C; and the sizes of field which may be regarded as borderline, X, for myopes and presbyopes and Y for emmetropes and hyperopes. 150 nonpathological cases.

Graphic representations of the results are given in figures 1 to 8. In figures 1 to 5 the representation is in the form of frequency curves; in figures 6 to 9 in the form of maps of the field. In addition certain comparisons are shown in tabular form. These comparisons are given in tables 1 and 2.

In figure 1A the cases are rated on the basis of average breadth of field for the 0.17-degree stimulus in the eight meridional quadrants, expressed in degrees; and in figure 1B for the one-degree stimulus. For the purpose of grading and representation in the plot, the cases were separated into groups, each group covering a range of two degrees. The range of average breadth of field for the 0.17-degree stimulus is 34.3

to 58.5 degrees; for the one-degree stimulus 60.3 to 73.1 degrees. For the 150 cases examined the range for the two sizes did not overlap, that is, the largest size of field for the 0.17-degree stimulus was smaller than the smallest size of field for the one-degree stimulus. The two distributions can therefore be shown for comparison side by side on

the same system of coordinates. The cases are designated with regard to condition of refraction according to a key shown in the chart. In figure 2 a similar representation is made for the cases based on area of field mapped to a scale of 12 mm. to 10 degrees and measured with a planimeter. Figure 2A shows the area in square centimeters for the 150 cases for the 0.17-degree stimulus, and figure 2B for the one-degree stimulus. Again the cases were separated into groups, each group covering a range of ten square centimeters. The range of area of field for the 0.17-degree stimulus was 47.3 to 137.6 square centimeters; for the one-degree stimulus 144.5 to 212.5 square centimeters. Since the range



for the two sizes was found to be mutually exclusive, it was possible also in this case to show the two distributions side by side on the same system of coordinates.

In figure 3A are given frequency curves for each type of error of refraction for the 0.17-degree stimulus, and in figure 3B for the one-degree stimulus. These frequency curves are based on

(2) The range of variation of size of field is greater for the 0.17-degree than for the one-degree stimulus. A comparison of the ranges is given in table 2. In this table the range of average breadth of field for each size of stimulus is given in degrees and percent for the total number, for the middle eighty percent, and for the middle fifty percent of cases. In computing the percentage

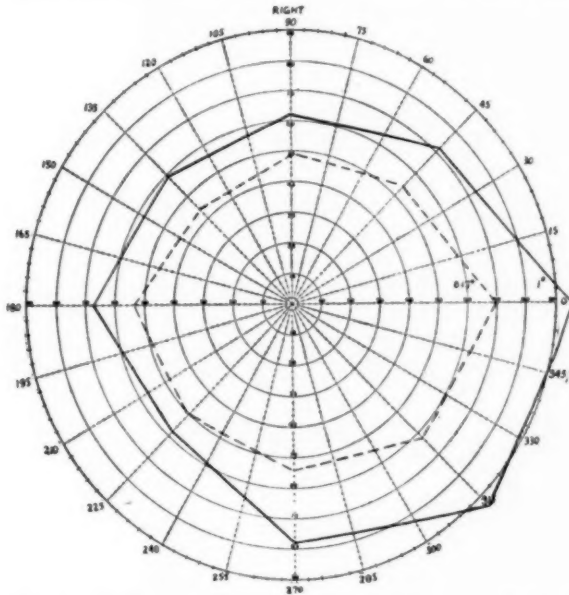


Fig. 7 (Ferree, Rand, and Monroe). Showing for 150 nonpathological cases the widest fields for the 0.17 and 1-degree stimuli.

average breadth of field in the eight meridional quadrants.

The results may be summarized as follows:

(1) In general the emmetropes and hyperopes have the wider fields, the myopes and presbyopes the narrower fields. However, the tendency for the separation into the two groups is not so clearly marked for the 0.17-degree stimulus as for the one-degree stimulus. We find in general the largest average breadth of field for the emmetropic group and the smallest for the presbyopic group. In order from largest to smallest the groups rank as follows: emmetropes, hyperopes, myopes, and presbyopes. The above comparisons are shown in figures 1A, 2A, and 3A, and in column 4 of table 1.

the average value for the group in question was used as the base. These data are given for the entire group of 150 cases and for each refraction group considered separately. From this table it is seen (a) that for the entire group the range of variation expressed in degrees is approximately twice as great for the 0.17-degree stimulus as for the one-degree stimulus, and that expressed in percentage it is almost three times as great; (b) that in general the range of variation for both the 0.17 and the one-degree stimulus is smallest for the presbyopic group and largest for the myopic group.

The greater scatter of results for the 0.17-degree stimulus is brought out still more clearly in figure 3. In this figure, as already stated, the relation of



TABLE 1

SHOWING THE AVERAGE BREADTH OF FIELD FOR THE DIFFERENT REFRACTION GROUPS FOR THE 0.17 AND 1-DEGREE STIMULI AND THE CUT PRODUCED BY USING THE 0.17-DEGREE STIMULUS

Refraction group	Number of cases	Average breadth of field		Decrease in average breadth of field	
		1-deg. stimulus	0.17-deg. stimulus	Degrees	Percent
Emmetropia	32	67.1	49.4	17.7	26.4
Hyperopia	63	66.9	48.1	18.8	28.1
Myopia	19	65.5	47.5	19.0	28.6
Presbyopia	34	64.4	43.5	20.9	32.4
Mixed astigmatism	2	65.2	46.5	18.7	28.7
Entire group	150	66.3	47.6	18.7	28.2

errors of refraction to size of field has been shown in the form of frequency curves for each type of error of refraction and for both sizes of form stimulus, one degree, and 0.17 degree.

(3) The cut in the field produced by decreasing the stimulus from one degree to 0.17 degree is greatest for the presbyopic and least for the emmetropic group. As to magnitude of cut the order from greatest to least is presbyopes, myopes, hyperopes and emmetropes. This is shown in table 1. In this table are given for comparison the average breadth of field for each size of stimulus for each refraction group, and the average decrease in breadth of field produced by decreasing the stimulus from 1 to 0.17 degree, expressed in both degrees and percentage. As compared with the entire group of 150 cases, it is seen that by decreasing the size of

stimulus the field is cut less than the average for the emmetropes and greater than the average for the presbyopes. The cut for hyperopes and myopes is approximately equal to the average cut for the entire group.

This greater effect of decrease of size of stimulus on the fields for the presbyopes, myopes, and hyperopes is still another confirmation of a principle that we stated tentatively some years ago, namely, that a factor which influences the size of field will produce a greater effect when acting in the presence of one or more other factors, pathologic or nonpathologic.

The distribution and frequency of the percentage amount of cut produced by using the 0.17-degree stimulus is shown for the different refraction groups in figure 4. This plot is presented in view of possible diagnostic

TABLE 2

SHOWING A COMPARISON OF THE RANGE OF VARIATION OF SIZE OF FIELD FOR THE DIFFERENT REFRACTION GROUPS FOR THE 0.17 AND THE 1-DEGREE STIMULI

Refraction group	Number of cases	Size of stimulus (deg.)	Range of size of field								
			Total number of cases			Middle 50 percent of cases			Middle 50 percent of cases		
			Limiting values	Degrees	Percent	Limiting values	Degrees	Percent	Limiting values	Degrees	Percent
Emmetropia	32	1	72.6-62.9	9.7	14.4	70.1-63.3	6.8	10.1	68.5-64.8	3.7	5.5
		0.17	58.5-42.3	16.2	32.8	55.1-44.3	10.8	21.8	52.4-46.1	5.7	11.5
Hyperopia	63	1	73.1-60.6	12.5	18.7	70.6-64.1	6.5	9.7	68.3-65.5	2.8	4.2
		0.17	57.6-39.8	17.8	37.0	53.6-44.1	9.5	19.8	50.5-45.1	5.4	11.2
Myopia	19	1	72.0-61.5	10.5	15.8	69.5-63.0	6.5	9.8	68.6-65.5	3.1	4.7
		0.17	56.3-38.3	18.0	37.9	53.3-39.4	13.9	29.3	51.5-44.0	7.5	15.8
Presbyopia	34	1	67.4-60.3	7.1	11.0	67.0-61.3	5.7	8.9	65.9-63.3	2.6	4.0
		0.17	50.0-34.3	15.7	36.1	47.6-37.6	10.6	24.4	46.6-41.0	5.6	12.9
Entire group	150	1	73.1-60.3	12.8	19.3	69.6-63.6	6.6	10.0	67.8-64.5	3.3	5.0
		0.17	58.5-34.3	24.2	50.8	53.3-41.0	12.3	25.8	50.4-44.5	5.9	12.4

service. That is, one of the possibilities of separating pathologic from non-pathologic cases is the greater cut in the size of the field produced by using stimuli of reduced visibility. In this connection perhaps the most desirable achievement would be to find an amount of reduction that would produce a cut in the fields of pathological eyes, but not those of nonpathological eyes. In figure 5 the results repre-

the smallest field for the one-degree stimulus and the field for the 0.17-degree stimulus for that observer. In each case a similar effect is shown, namely, the field is cut on the temporal more sharply than on the nasal side. In other words, wherever very wide limits are found for the one-degree stimulus, the field will be more strikingly narrowed by the 0.17-degree stimulus. That this is not a character-

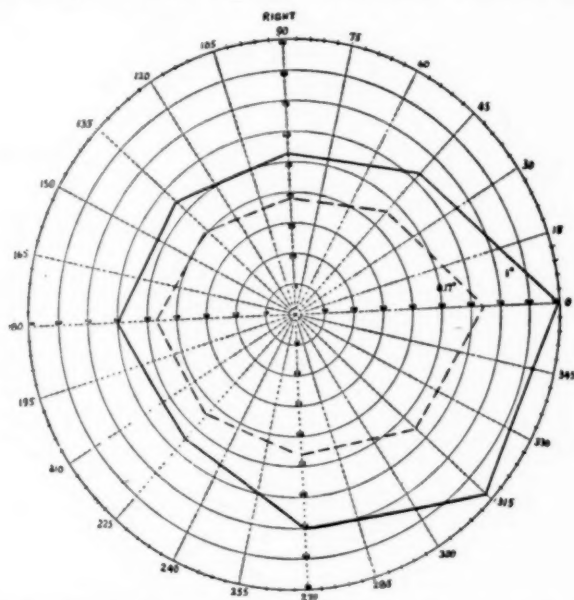


Fig. 8 (Ferree, Rand, and Monroe). Showing for 150 nonpathological cases the average field for the 0.17 and 1-degree stimuli.

sented in figure 4 are plotted in the form of frequency curves for the different refraction groups.

(4) The shape of the fields for the 0.17-degree stimulus is different from that obtained with the one-degree stimulus. This is shown in the maps given in figure 6. The cut produced by using the smaller stimulus is sharper on the temporal than on the nasal side, the effect of which is to give the field a more rounded contour. To bring out this point more clearly, the maps in figures 7 to 9 have been made. These give respectively the largest field for the one-degree stimulus and the field for the 0.17-degree stimulus for the same observer; the average field for each of the two sizes of stimulus; and

istic finding for all stimuli of low visibility will be shown in later papers, where it will be demonstrated that the other two methods of reducing visibility mentioned earlier in the present paper, namely decrease of difference in coefficient of reflection between stimulus and background and decrease of intensity of illumination, do not produce this change of shape of field. It is probable that in the use of very small stimuli, the poor refractive condition of the extreme periphery is given greater prominence as a factor influencing extent of field. This probability, as well as that of a greater scatter of results with a very small stimulus, was pointed out in an earlier paper.

In the use of the 0.17-degree stimu-

lus in diagnosis, this change in shape due to the contraction of the temporal field should be kept clearly in mind, lest it be taken to indicate a pathological condition. We have found, for example, just such a change in shape in certain pathological fields taken with stimuli whose visibility has been decreased by decreasing the difference in coefficient of reflection between object and background.

prove of no advantage at all. However, it may be well to note at this time the points that may have a bearing on diagnosis. An inspection of figure 1 shows that only one case of emmetropia or hyperopia has a field which falls below forty degrees average breadth of field, and only four cases have fields which fall below forty-two degrees. In determining the borderline or suspicious size of field for diagnostic purposes we

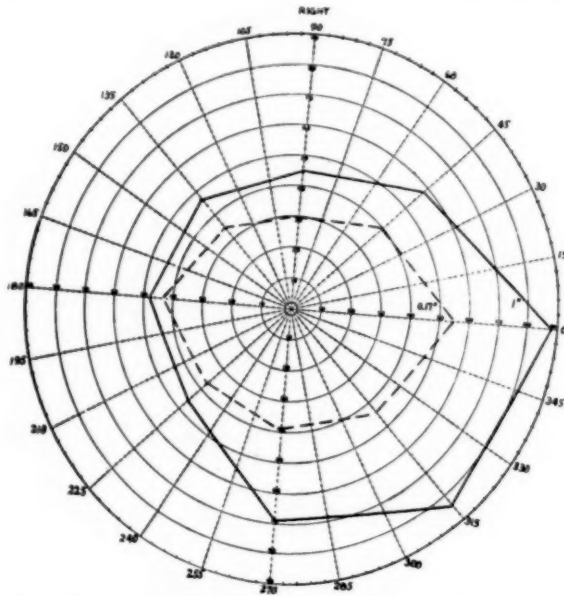


Fig. 9 (Ferree, Rand, and Monroe). Showing for 150 nonpathological cases the smallest fields for the 0.17 and 1-degree stimuli.

(5) The distribution of cases for the 0.17-degree stimulus is in general of the same type as was found for the one-degree stimulus and for the chromatic stimuli, that is, when plotted the results approximate the normal or Gaussian frequency curve. The approximation is not so close as for the one-degree stimulus but much closer than for the chromatic stimuli.

Because of the greater range of scatter of results obtained with the 0.17-degree stimulus, it is probable that the use of a very small stimulus will not prove to be of as great advantage in diagnosis based on size of field as it is in case of shape of field and in scotometry. Indeed, as indicated in a former paper and in the introduction to this paper, it may

have, therefore, chosen forty-two degrees as the limit for the emmetropic and the hyperopic group. No myopic fields occur with an average breadth of less than thirty-eight degrees, and only four presbyopic fields have an average breadth between thirty-four and thirty-eight degrees. It seems probable then that a myopic or a presbyopic field of less than thirty-six degrees average breadth should be regarded as borderline. In figure 6 maps are given showing the largest average and smallest fields of the 150 cases tested with the 0.17-degree stimulus, and the two fields which we have selected as borderline or suspicious. Of these latter two, Y represents the field we have called borderline for the emmetropes and hy-

peropes and X for the myopes and presbyopes. An inspection of these maps should give a good idea within what

limits a field ought to fall to be within the normal range of variation.

*Wilmer Ophthalmological Institute.*

## CONCERNING CONTACT GLASSES

R. VON DER HEYDT, M.D., AND HARRY GRADLE, M.D., F.A.C.S.  
CHICAGO

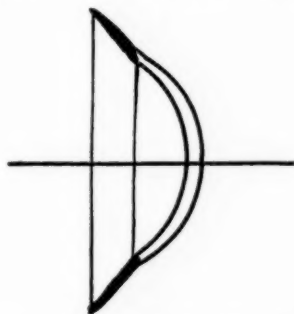
The structure and purpose of the contact glass are briefly outlined. To the more usual employment of the contact glass to overcome defects of vision due to irregularities of corneal curvature, Heine has recently added the proposal that they shall be used for the correction of ordinary refractive errors, in cases where there is special objection to the wearing of spectacles or nose glasses, as in actors and singers.

Of late there have appeared in the continental papers various articles concerning the replacement of the usual ophthalmic lenses, in spectacle or pince-nez form, by contact glasses. In due course of time we may expect some similar articles, but on a more sensational basis, in our own press. These which have appeared in Europe were inspired by Heine of Kiel, who spoke at the last international congress, in Amsterdam, on such usage and demonstrated a few patients whose vanity led them to the use of the inconspicuous contact glass to replace the usual spectacles. Undoubtedly such individuals do exist, but fortunately they are few in number.

**Description:** Contact glasses are not new. In 1887, A. E. Fick had some made by the late Professor Abbé of the Zeiss works at Jena, and these he described the next year in the *Archiv für Augenheilkunde*. Since then, more than twenty articles dealing with this subject have appeared and minor details of precision and use have been added. The original glasses were most skilfully blown, but of recent years contact glasses have been ground. A contact glass consists of an artificial cornea with an extended shoulder that fits snugly on to the sclera. The glass has the same refractive index as the cornea, but is made with various radii of curvature to correspond with the ocular condition necessitating its use. The radii of curvature of the anterior and posterior surfaces of the corneal portion of the glass are equal, though

a spherical correction may be included. The scleral shoulder has a radius of curvature of twelve millimeters, and tapers to a fine edge. (See diagram.)

**Method of application:** When the glass is first applied to a patient, the eye must be anesthetized, but after continued use the anesthesia may be dispensed with. The contact glass, concave surface upward, is filled with warm saline solution and is held either between the finger tips or preferably on the wet end of a rubber nursing bottle nipple (bottle end). Seal the hole in the other end of the nipple. By squeez-



Contact glasses (Von der Heydt and Gradle). Diagram of contact glass in cross section. The scleral shoulder is the black area in the cut.

ing the bulb before applying, a vacuum may be created that will hold the contact glass quite firmly (if wet). The patient bends forward, and the upper and lower lids are retracted with the fingers of the other hand. The contact glass is then applied directly over the cornea. Pressure against the nipple releases the

hold upon the contact glass. Care must be taken that air bubbles are not present between the contact glass and the cornea, but with a little practice this difficulty is soon avoided.

In choosing the contact glass suited for the individual eye, the slit-lamp should be resorted to in order to be sure that there is no contact between the posterior surface of the glass and the anterior surface of the cornea. This is facilitated by the use of a fluorescein solution instead of the usual saline, whereby the beam of the slit-lamp becomes visible in the space between the cornea and the glass.

Indications for use: Contact glasses are used to improve vision in cases where irregularities of the anterior surface of the cornea are sufficient to cause irregular refraction of entering rays of light and thus to distort the retinal image. The purpose is accomplished by eliminating refraction by the anterior surface of the cornea. The added salt solution and the contact glass have essentially the same index of refraction as has the cornea, and consequently a ray of light coming to an eye armed with a contact glass undergoes no material change in its course between the anterior surface of the contact glass and the posterior surface of the cornea. The most marked

changes in the surface contour of the cornea that necessitate the use of the contact glass are (1) irregular astigmatism, for which the glass was first designed, and (2) keratoconus. Heine now proposes to popularize the contact glass by adding a third group, namely, simple ametropia, which can be corrected by incorporating into the glass the necessary correction.

It must be distinctly understood that poor vision, due to scars of the cornea, lens opacities, or any other lack of clarity of the refracting media, cannot be corrected by contact glasses. Improvement in vision through the use of contact glasses is possible only when the retinal distortion is due to irregularities of the anterior corneal surface.

The replacement of ordinary ophthalmic lenses by contact glasses is perfectly feasible, but it must be borne in mind that the continued use of a contact glass (more than six to eight hours at a time) is apt to be very irritating. Still, in actors, opera singers, and other individuals whose ametropia calls for temporary correction without the use of spectacle glasses, there is a field for contact glasses.

25 East Washington street (Von der Heydt).

58 East Washington street (Gradle).

### References

The appended list does not pretend to be complete, but merely contains the major references from which complete bibliography may be obtained.

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# TENDON TRANSPLANTATION FOR PARALYSIS OF THE SUPERIOR RECTUS

LUTHER C. PETER, M.D., F.A.C.S.

In a case of paralysis of the superior rectus associated with the proptosis of exophthalmic goiter, the paralyzed superior rectus was advanced; the upper halves of the external and internal recti were freed and then reattached to the stump of the superior rectus; and finally the inferior rectus muscle was divided and then reattached further back. Read before the Section on Ophthalmology of the College of Physicians of Philadelphia, March 20, 1930.

This case of paralysis of the left superior rectus muscle, improved by ten-

Diplopia developed in July, 1928, and increased during the next month. As-

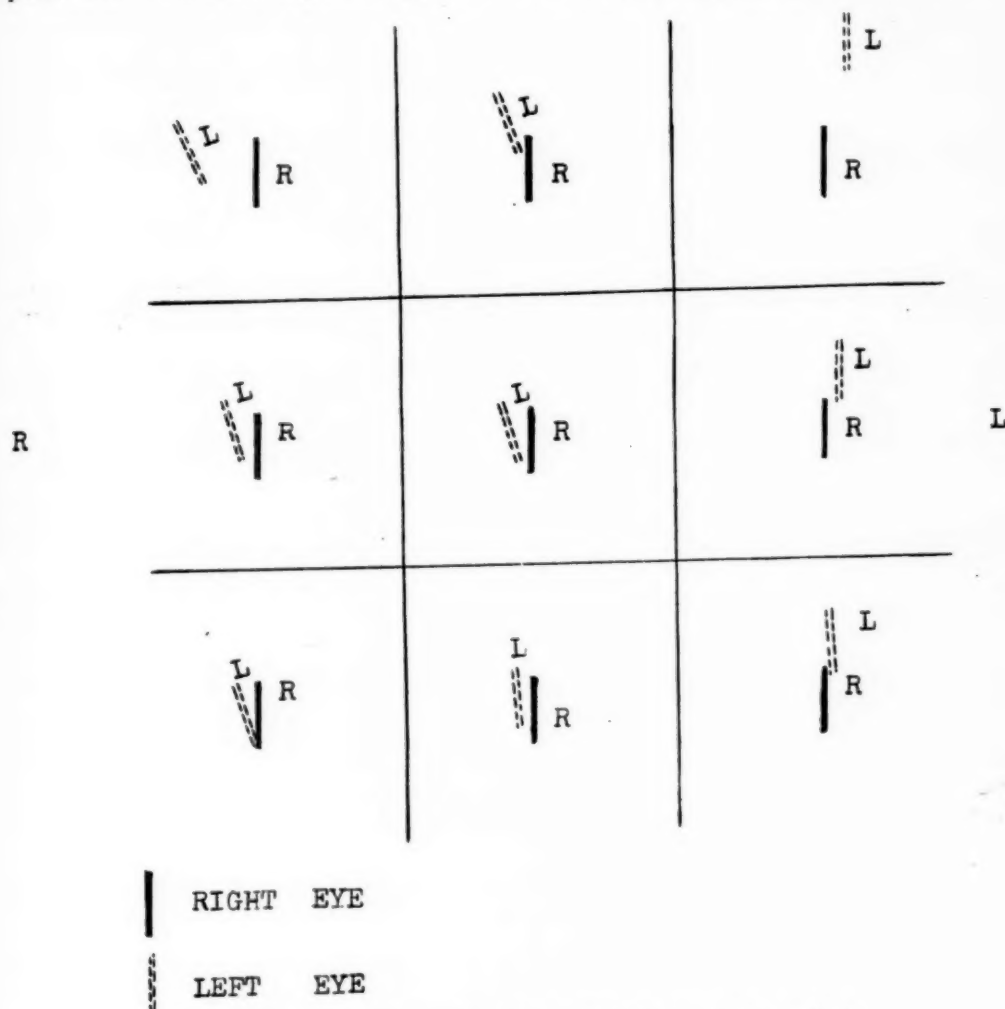


Fig. 1 (Peter). Diplopia field charted by the anatomic method.

don transplantation, is presented because it is a bit unusual, and because of several other features of interest.

sociated with the diplopia was a marked exophthalmos of the left eye, four millimeters of proptosis being present.

The patient's head is tilted toward the right shoulder, and the face is turned up and to the left. The diplopia field shows vertical diplopia of maximum degree up and to the left. In the upper right field, there is slight crossing of the images, but there is little or none to the left.

The diagnosis manifestly is paralysis of the left superior rectus muscle.

Under local anesthesia, the left su-

perior rectus muscle was advanced; and the upper halves of the internal and external recti were split back for about eleven or twelve millimeters, and were fastened respectively to the internal and external borders of the superior rectus stump. The inferior rectus tendon was receded and reattached about three millimeters posterior to the old tendon stump. The conjunctival wounds were closed by uninterrupted silk sutures.

Rotation fields before and after operation are of much interest. The patient can now rotate the left eye upward about twenty-two degrees above the horizontal, a gain of forty degrees upward. The muscle balance shows

four degrees of right hyperphoria and two degrees of esophoria at six meters, and fifteen degrees of right hyperphoria and orthophoria in the lateral at thirty-three centimeters.

With proper head position, the patient is now free from diplopia. In order to make him more comfortable, I propose to resect the right inferior rectus muscle.

The case is of interest, first, as to

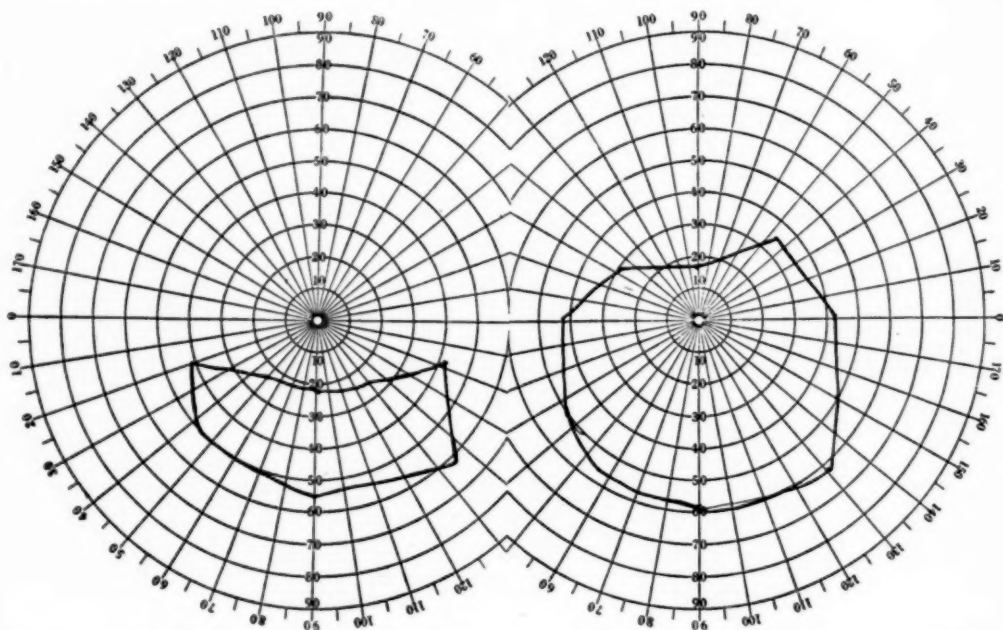


Fig. 2 (Peter). Fields of rotation before and after operation (anatomic method).

etiology, the paralysis probably being associated with the proptosis of thyroid disturbance. Second, the proptosis is characteristic of the persistence of exophthalmos after recovery from other symptoms of Graves's disease. It was a complicating factor during the operation. Third, the results are gratifying in a paralytic type of squint.

In 1921 I reported my first case of tendon transplantation before the section on ophthalmology of the College of Physicians of Philadelphia. That was a case of paralysis of the external rectus of the left eye, in which the final rotations were forty degrees internally and fifty degrees externally. Five other cases of external rectus paralysis, upon

Rotation fields before and after operation are of much interest. The patient can now rotate the left eye upward about twenty-two degrees above the horizontal, a gain of forty degrees upward. The muscle balance shows

etiology, the paralysis probably being associated with the proptosis of thyroid disturbance. Second, the proptosis is characteristic of the persistence of exophthalmos after recovery from other symptoms of Graves's disease. It was a complicating factor during the operation. Third, the results are gratifying in a paralytic type of squint.

which I have operated by similar methods since 1921, have had varying results of from central fixation to twenty-five degrees of external rotation. The operation offers the only satisfactory correction in paralytic types of squint, and is deserving of most careful study to improve the technique.

In the seven cases which I have operated on by a modification of the O'Connor technique, the variations which seem to have given me the best results are, first, the transplanting of one-half of the tendon instead of a smaller strand; second, a very free advancement of the paralytic muscle; and

third, complete tenotomy or recession of the antagonist. In my earlier cases, I transplanted too small a part of the tendon. A generous half seems to offer better prospects of good rotation in the field of the paralytic muscle. Concerning the last modification, in paralysis of the external rectus it is possible to completely tenotomize the internal rectus without danger of creating a paralytic divergent squint. In paralysis of a vertically acting muscle, the tenotomized tendon should be securely attached to the globe.

*1930 Chestnut street.*

## SURGERY OF THE CLOSED PUPIL

ALBERT E. BULSON, M.D., F.A.C.S.

FORT WAYNE, INDIANA

Emphasis is laid upon the value of the V-shaped incision with the Ziegler knife, and three case reports are given to illustrate the possibility of obtaining useful vision in eyes which have been given up as hopeless. Presidential address presented before the Indiana Academy of Ophthalmology and Otolaryngology, December, 1929.

What to do for the closed or occluded pupil is a problem that often confronts the eye surgeon, and failure to solve the problem or to give it any consideration may spell the doom of the patient so far as useful vision is concerned. Occlusion of the pupil is not as common as it was in an earlier day when operative treatment and therapeutics were not as successful as they are today, but the unfortunate condition occurs sufficiently often to justify a serious consideration of means and measures for overcoming it.

A closed pupil may occur as a direct result of unskillful surgical procedures, of trauma and of a retention of lens matter following cataract extraction of both hard and soft cataracts; nearly all are made worse by inflammatory reaction and a deposit of plastic exudate in the pupillary area. Most of the cases seen today are what may be termed membranous occlusion of the pupil following removal or attempted removal of the lens with subsequent closure of the pupil by thickened lens capsule or inflammatory exudate. Often

there is also a fluid vitreous due to degenerative changes. Occasionally cases are seen in which the occlusion of the pupil has followed directly as a sequel of repeated attacks of iritis, perhaps badly managed, and closure of the pupil by an organized exudate. The latter perhaps may be benefited by an optical iridectomy, but as a rule there have been degenerative changes in the lens, with the development of cataract requiring extraction, and in the end there usually remains the occluded pupil which will require attention if any effort is to be put forth to give the patient useful vision.

According to Wood (*System of Ophthalmic Operations*) the making of an artificial pupil was done first over two hundred years ago, in 1728, by Cheselden. His operation was made with a knife-needle, and the opening was a long, oval slit, horizontally placed. This operation, with certain modifications in technique, was performed by others for a period of forty years, or until 1768, when the scissors method came into use. This consisted in intro-

ducing a pair of fine scissors through an opening in the cornea and either puncturing the iris with the blade of the scissors or putting one blade of the scissors through an opening previously made with a knife and then dividing all structures in such a way as to make an artificial pupil. This operation, with various modifications, was practiced for a number of years, and the DeWecker modification, proposed in 1873, still is recognized as perhaps the best of the scissors operations.

Within recent years the knife-needle operation has returned to popularity, largely through the efforts of the late S. L. Ziegler, who, after several years of experience and perfection of technique, published his classical article on the subject in 1908, after presenting the same before the Section on Ophthalmology of the American Medical Association. In presenting the subject Ziegler insisted that success depended upon the selection of a knife with a very sharp point and sharp cutting edge, the cutting edge being seven millimeters long, the blade not to exceed one millimeter in width at its widest point, with a rounded shank the same diameter throughout, and a certain definite technique in the performance of the operation. The knife-needle that he recommended has been made ever since according to his specifications and is sold by instrument makers under the name of the Ziegler knife-needle.

Originally the knife-needle advocates made a single incision through the iris, exudate and capsule, and trusted to the natural retraction of the iris fibers to maintain the artificial pupil, and, while such an operation had the advantage of easy accomplishment and less postoperative disturbance, yet the opening frequently closed by plastic exudate. On the other hand, the scissors method, even if it produced a good pupil, was more difficult of accomplishment, caused more traumatism to the eye, often was complicated by great loss of fluid vitreous, and frequently was followed by severe inflammatory reaction. If, however, it proved successful, the

resulting pupil was permanent and sufficiently large for visual purposes.

Recognizing the disadvantages of all operations previously performed for opening the closed pupil, Ziegler conceived the idea of making two incisions, jointly, V-shaped, apex upward, the two incisions being joined at the apex before the removal of the knife-needle from the eye. The advantages of the operation, as so well stated by Ziegler, are the ease with which the incision is made, the lack of traction on the ciliary body, the freedom from postoperative inflammatory reaction, the avoidance of opening an eyeball which may contain fluid vitreous, the lessening of the tendency to iris hemorrhage from lowered tension, and the avoidance of the nebulous scar which often follows a large corneal incision in old inflammatory eyes. The disadvantages revealed in the method have been ascribed to faulty instruments as well as faulty operative technique.

To Ziegler we owe much for an operation which, if carried out according to his method and technique, offers many advantages over any other surgical procedure so far recommended for the closed pupil. The point that I especially wish to emphasize is the fact that the closed pupil, particularly in the hands of those who have not had wide experience and excellent training, and even sometimes by the latter, is too often considered a hopeless condition and the patient is not given the benefit of a procedure that in a large percentage of cases gives favorable results. Some of the patients presented to us are blind in both eyes, or perhaps in the only remaining eye, and the recovery of useful vision, even to the extent of enabling the patient to get around unattended, is a great godsend to such unfortunates.

It may be that the occlusion of the pupil is due to an exudate under which there is a very thin capsule, a condition holding the most promise, or it may be that the obstruction is due to very dense plastic material and underneath that a very tough membrane, all of which offers unusual difficulty in securing a pupil. Then too, there may be, and



usually are, extensive degenerative changes, including fluid vitreous and perhaps some detachment of the retina, which offer further difficulties in securing useful vision; yet, if fairly good light perception and light projection are retained, some hope may be held out to the patient concerning recovery of at least better vision than he possesses with the pupil entirely closed.

It also should be noted that some of these closed pupil cases, having a moderate amount of increased tension and perhaps a mild type of persistent congestion of the eyeball, are benefited by an iridotomy by the Ziegler method; I have tried it several times in such cases with fairly satisfactory results, and have perhaps avoided an enucleation that seemed unavoidable.

In my own experience the Ziegler operation for closed pupil has usually been very satisfactory, and I know that in several instances I have made the patient very happy through the restoration of useful vision when previously the patient was helpless, and although the eye condition had been pronounced hopeless by other ophthalmologists. I desire to emphasize the necessity of following the Ziegler technique throughout, and in this connection I take the liberty of quoting from the original article by Ziegler, presented at the Chicago session of the American Medical Association in 1908, which paper I had the privilege of discussing at that time. The essentials of success of an iridotomy by the knife-needle method as condensed from Ziegler's description are as follows:

(1) A good knife-needle (Ziegler's) must be selected. It must have a well-sharpened point and edge.

(2) The character of the incision in the iris membrane is of vital importance. It should be a double incision, and V-shaped, which is the only one that will cut through all the iridic fibers in such a way as to give the greatest retraction of the membrane.

(3) No pressure should be made in cutting, which is the main secret of success whether you are incising a dense, feltlike iris membrane, or a thin,

filmy capsule. If this rule is observed all traction on the ciliary body will be avoided.

(4) The knife-needle should slide backward and forward through the corneal puncture with a gentle sawing movement.

(5) The corneal puncture above and the membrane counterpunctures below should be far enough apart to make the corneal puncture a good fulcrum for the delicate leverage necessary in executing the iris incision.

(6) The knife-needle should be so manipulated that no aqueous is lost, for this accident may prevent the completion of the operation and may increase the tendency to iris hemorrhage by lowering the ocular tension. The shank of the knife, being of the same diameter throughout, tends to prevent escape of aqueous.

(7) Every incision should be made a thoroughly clean-cut incision and all tearing of the tissues should be avoided.

(8) Perfect artificial illumination should be secured, as both iridotomy and capsulotomy require constant and close inspection of the operative field. My own preference is the light from a focused spotlight.

The technique of the operation is expressed so clearly and comprehensively in Ziegler's original paper that repetition seems unnecessary. Success depends upon following the technique as described. The puncture of the cornea should be above near the limbus, and the two counterpunctures below should be approximately three millimeters from the apparent iris circumference and five or six millimeters apart. The knife should cut and not tear, the incisions being carried out by a gentle, sawing movement. Failure may occur as the result of using a knife-needle that is not extremely sharp, or in not separating all of the fibers at the apex of the triangle. It is better to have the two incisions cross in order to effect a division of all the fibers. If the flap does not retract it may be crowded down with the point of the knife. Sometimes a second introduction of the knife is necessary in order to cut the fibers at

the apex which can not be divided, because the apex is too close to the fulcrum. Tearing of the membrane, puncture of the ciliary body, or undue traction of any kind may cause inflammatory reaction.

Ordinarily there is little or no reaction and the corneal wound is closed within three or four days. If post-operative inflammatory reaction does occur, the usual antiphlogistic treatment consisting of elimination, ice compresses, and salicylates is indicated. Occasionally a very dense, fibrous membrane involving a portion of the iris and pupillary space must be avoided, and the artificial pupil must be placed in tissue that yields more easily to the knife, but in the main if the sharp knife-needle is properly used it will cut almost any tissue encountered.

The anesthesia ordinarily employed in cataract extraction, including subconjunctival injections of the anesthetic, is satisfactory.

While I have used the Ziegler operation in a number of cases with excellent results, I desire to report only three; all were given up by the physicians who had operated them, and all show the possibility of obtaining useful vision in apparently hopeless cases.

#### Case reports

**Case 1.** A housewife aged fifty-seven years had had an unsuccessful cataract extraction by the combined method in 1907. The history indicated that a second attempt had been made to remove the lens matter through a corneal incision. Subsequently the pupil had become closed with a thick capsular membrane and inflammatory exudate. The attending physician had finally advised the patient that her condition was hopeless and that there was no possibility of securing useful vision. He had advised removal of the complicated cataract in the other eye, but as a result of her unhappy experience she had declined to have the work done.

I saw the patient ten years later, and

at that time she had sufficient vision in her unoperated eye to see large objects and get around unattended in familiar surroundings. In the so-called blind eye she had only fair light perception and light projection.

An operation by the Ziegler method was performed on July 24, 1917. The pupillary area was closed by dense tissue consisting of lens capsule and inflammatory exudate, but, by taking sufficient time to make the V-shaped incision, a good sized clear pupil was obtained. The vision with a correcting lens a week after the operation was 15/40; twelve years later, or on June 19, 1929, the vision was 15/30—3, with a correction of +9.00 sphere +4.50 cylinder axis 70 degrees.

**Case 2:** A farmer, aged forty-five years, gave a history of pronounced rheumatic iritis and repeated attacks of inflammation of both eyes dating back twelve years. In 1907, the left eye, which had been blind and painful for several months, was removed. Fifteen years later the patient came under my care, and his remaining eye was found to have a completely closed pupil from an organized exudate. Vision was reduced to light perception. The tension was below normal, indicating extensive degenerative changes, but the eye was free from active inflammation.

A through and through V-shaped incision was made, which included not only the iris and organized exudate in the pupillary area, but also included the lens, which unfortunately did not luxate during the operation as expected. Several days later the anterior chamber contained considerable lens matter, but there was no very active inflammation present and the patient was not uncomfortable. A milk injection was administered, and hot, moist compresses were applied to the eye. Gradually the anterior chamber cleared, and when the patient was seen last on April 19, 1926, more than four years after his operation, he had a vision of 15/200 with a correcting lens. He informed me at

that time that he was driving a truck for a coal yard, and for the first time in twelve years he was able to get about unattended and to earn a living for himself and family.

**Case 3.** Housewife, aged fifty-three years. Three years prior to seeing me she had undergone a cataract extraction in the right eye. The operation had been followed by a succession of inflammatory attacks which finally left her with a closed pupil and vision reduced to light perception. She had been told by her physician that nothing more could be done for the eye as intraocular degenerative changes had made it impossible to restore any useful vision.

Examination showed that the tension was but slightly reduced, and the eyeball was free from inflammation. The vision in the fellow eye was reduced to shadows as a result of cataract. In March, 1928, the Ziegler operation was done, and resulted in a good-sized central triangular pupil. Two weeks later a correcting lens of +11.00 sphere +4.00 cylinder axis 170 degrees gave the patient vision of 15/30, and that

vision has been retained up to this date.

These three cases can be duplicated by others that have come within my experience; they indicate the possibilities in cases of closed pupil that are hopeless as well as helpless unless something is done for them. Perhaps a considerable number of such cases do have a fluid vitreous and other degenerative changes which seemingly offer a decidedly unfavorable prognosis, especially if relief is attempted by performing an operation requiring opening of the eyeball by incision. However, everything is to be gained and little or nothing to be lost through an attempt to secure at least useful vision, and, therefore, the Ziegler operation is worthy of a trial in these unfortunate conditions. If it fails, the patient usually is no worse off than before, and we still may try the more formidable scissors operation. Even if an enucleation becomes necessary in consequence of reaction set up as a direct result of the attempt to restore some vision the patient is little or no worse off than before.

*406 West Berry street.*

## THE BACTERIAL FLORA OF THE NORMAL CONJUNCTIVA WITH COMPARATIVE NASAL CULTURE STUDY

ROBERT A. KEILTY, M.D.

WASHINGTON, D.C.

Using swabs cultured on blood-agar plates, fifty-seven percent of normal conjunctival sacs were found to carry one or more organisms on one or both sides, with no clinical evidence of inflammatory reaction of the conjunctiva, while forty-three percent were absolutely sterile. The organisms were of low virulence but of the suppurating variety, the hemolytic staphylococcus characteristic of the nasal flora predominating. Comparison with the nasal flora of the same series indicated that the source of infection was from the nose by way of the lacrimonasal duct. From the pathological laboratories of the Diagnostic Center, United States Veterans' Bureau.

The purpose of this paper is to present the bacteriological findings, as recorded on aerobic blood-agar plates, in a study of the conjunctival sacs of one hundred selected cases of normal eyes. The associated nasal cultures and their relationship to the conjunctival results have been included.

For several years past the futility of relying on smears alone for the bacterial flora of the eyes was quite apparent to me, and this is the consensus of opinion in the literature. Soon after the war a cultural check was made on many cataract cases as a preparatory precaution. The accurate summary of these records is not available, but many were sterile and many contained organisms of one kind or another. During the past two years a serious effort has been made to work out a procedure whereby those cases showing positive cultures could be rendered bacteria-free by chemotherapeutic measures.

The literature is not very voluminous, and is well covered by Lucic<sup>1</sup>. It is generally agreed that the normal conjunctival sacs do contain bacteria in a large number of cases, without showing any evidence of inflammatory reaction. At the same time the bacterial types found are pathogenic and vary qualitatively and quantitatively according to the conditions of the various studies.

**Method of culture making.** All cultures mentioned in this report were planted aerobically on standard rabbit's or human blood-agar plates. The material was obtained by cotton swabs. I do not want to take issue with How-

ard and the others who insist on scraping, but I am favorable to the use of swabs for several reasons. The whole surface of the conjunctival sac is covered and, where the swabbing is done immediately following nasal culture, advantage is taken of the flushing of the eyes with the reflex tears. The swabs will obtain all surface cells which are necrotic and upon which bacteria may be resident. The scraping by instruments may take off more cells, but bacteria are not resident on living cells and do not penetrate the normal barrier of living cells to any extent. When the latter happens abnormal conditions arise and conjunctival inflammatory reaction results.

For the eye cultures, the patient was requested to look upward, the lower lid was pulled gently downward, and the swab was passed backward and forward over the conjunctiva of the lower lid, dipping well into the corners and using great care not to touch the margins or skin surfaces. This procedure scraped off many surface conjunctival cells but did not penetrate or abrade the surface. The eye cultures were taken immediately after the nasal cultures, since in many cases a reflex outflowing of tears followed the smearing of the nasal mucosa, and this helped to wash off the desquamated surface cells upon which bacteria had previously found an excellent culture bed.

This report contains details of comparative nasal cultures. The nasal material was also obtained by swab, using a fresh one for each side of the nose, as was done for each eye. The swab was



passed carefully through the vestibule of the nose above the turbinate and then along the floor to the posterior nasal cavity, rubbed gently along the sides, and rapidly withdrawn. The swabs were streaked across the blood-agar plates and the latter were incubated at 37.5° C. for forty-eight hours. As the end of this time the types and numbers of colonies were noted.

For the purpose of this report the only culture medium used was blood-agar plates, since most of the organisms likely to be present in the eyes will be grown by this method. For individual study cases any other medium which would be likely to pick up any additional bacteria would be advisable, and I am in the habit of planting glucose broth, blood serum, and modified slant anaerobic tubes. Lucic used blood-agar plates with large tubes of Loeffler's blood serum and Besredka's medium, and argued for a time saving by the latter over plates. Since it takes forty-eight hours incubation to bring up colonies of the nonhemolytic streptococcus, and since they grow very sparsely at that, time must be a factor.

**Results obtained:** One hundred patients selected for normal eyes were studied. Forty-three cases were sterile in both eyes and thirty-four cases showed bacterial colonies in both eyes. Six cases were sterile in the right eye and showed colonies in the left eye, and seventeen cases were sterile in the left eye and showed colonies in the right eye. In the summary (table 1), forty-three cases are shown as sterile in both

Table 1

INCIDENCE OF STERILE AND ORGANISMAL GROWTH  
IN THE SUMMARY OF ONE HUNDRED CASES OF  
NORMAL EYES

Both sides sterile.....	43 percent
Both sides showing organisms..	34 percent
Right sterile, left organisms....	6 percent
Left sterile, right organisms....	17 percent
One or both sides showing organisms .....	57 percent

eyes and fifty-seven as having colonies in one or both eyes.

Thirty-four cases (table 2) showed organisms in both eyes. Twenty-eight, or 82 percent, of these showed the same

organisms on both sides and six, or 17 percent, showed different organisms. Twenty-four of the twenty-eight showed one organism, the nasal hemo-

Table 2

ORGANISMS PRESENT ON BOTH SIDES

	No.	Percent
Both eyes showing organisms..	34	
Both eyes showing same organisms .....	28	82
Both eyes showing different organisms .....	6	17
Both eyes showing hemolytic staphylococcus .....	24	70
Both eyes showing nonhemolytic streptococcus .....	2	5
Both eyes showing hemolytic staphylococcus and nonhemolytic streptococcus .....	2	5

lytic staphylococcus, and two the nonhemolytic streptococcus. Two showed two organisms, the hemolytic staphylococcus and the nonhemolytic streptococcus. No other organisms were present on both sides. Six cases showed different organisms on both sides (table 3).

Table 3

ORGANISMS PRESENT IN BOTH EYE CULTURES BUT  
DIFFERENT ON EITHER SIDE

Right eye

	No.
Hemolytic staphylococcus .....	2
Hemolytic staphylococcus .....	1
Hemolytic staphylococcus .....	1
Hemolytic staphylococcus and nonhemolytic streptococcus .....	1
Hemolytic staphylococcus and influenza bacillus .....	1

Left eye

	No.
Nonhemolytic streptococcus.....	2
Bacillus hemophilæ.....	1
Mold .....	1
Hemolytic staphylococcus.....	1
Hemolytic staphylococcus.....	1

There were fifty-seven cases showing organisms in one or both eyes, and on a basis of ninety-one eyes studied, table 4 represents the different organisms found and the percentage of their occurrence. It will be seen that the hemolytic staphylococcus characteristic of the nasal flora markedly predominated, with the nonhemolytic streptococcus in a low second place and other organisms such as bacillus influenzae and bacillus hemophilæ probably

coincidentals. If the series of cases studied had been larger the presence of other different single coincidentals would be increased. It is interesting to note that these otherwise pathogenic organisms were present without a single physical sign of inflammation.

Table 4

DIFFERENT TYPES OF ORGANISMS PRESENT IN  
FIFTY-SEVEN POSSIBLE ORGANISM CASES IN  
ONE OR BOTH EYES ON A BASIS OF  
NINETY-ONE EYES STUDIED

Organisms	Cases	Percent
Hemolytic staphylococcus....	83	90
Nonhemolytic streptococcus....	11	12
Nonhemolytic staphylococcus albus .....	5	5.4
Nonhemolytic staphylococcus aureus .....	1	1
Bacillus hemophilie.....	1	1
Mold .....	1	1
Bacillus influenzae.....	1	1

It is curious that the rather high incidence of xerosis bacillus reported by other workers, Pillat 100 percent, Lucic 51 times out of one hundred cases, was not borne out in my present series of cases. While I am familiar with the organism, I may have mistaken it for some colonies classified as nonhemolytic streptococcus. The influence of season played a part, especially as to the findings of pneumococcus and hemolytic streptococcus. This work was carried out in Washington, D.C., during the warm summer months, when the pneumococcus, so prevalent during the winter months, almost entirely disappears from the mouth cultures, which probably explains their absence in our eye cultures. The same is true for hemolytic streptococcus. While the latter does not entirely disappear from the mouth culture it is somewhat reduced, and it certainly is reduced in the nasal cultures, to reappear just as soon as the cold weather sets in. The bacilli of Koch-Weeks and Morax-Axenfeld are definite pathogens not resident in the nasal or mouth floras under normal conditions, and thus they would not be found except under epidemic conditions.

The number of colonies present in the hemolytic staphylococcus cases was counted on each plate. Twelve were

noted as follows: two were confluent, five a heavy streak, three many, and two scattered. Thirty-seven plates had ten or fewer colonies, while thirty-one ranged from eleven to one hundred colonies per plate.

**The relationship of the nasal flora to the eye cultures.** This paper does not include data on what constitutes the ordinary normal flora on a blood-agar plate for the nose, but the large white colony with a distinct zone of hemolysis and made up of masses of gram-positive cocci, spoken of in this paper as the hemolytic staphylococcus, was present in every case on the nasal plates. This staphylococcus and a small muddy white nonhemolytic colony made up of gram-positive cocci in more or less chain formation, spoken of as the nonhemolytic streptococcus, were the most consistent findings.

There is a wide variation in the number of colonies from the nasal passages, but as a rule it may be stated that the nearer the nasal mucosa maintains an arbitrary normal the fewer the number of colonies there will be, as low as four or five. These cases were not selected from a normal nasal standpoint, so that many of them showed some pathological nasal changes.

The type of colony in the eye bears a direct relationship to the type in the nose on one or both sides, and for this reason it may be concluded that the majority of eye contaminations are of nasal origin. That these may be carried by an outside factor such as the finger or the handkerchief is possible, but, the majority holding so true to type and not showing organisms from other floras such as the mouth, the pathway of infection must be considered through the tear ducts either directly or by lymphatic drainage.

The number of colonies found in the conjunctival plates bears some relationship to the number of colonies on the nasal plates. Where the colonies were heavy on the eye plates they were also heavy on the nasal plates, with one exception in which the reverse was true. On the other hand, many equally heavy nasal plates had sterile eye

plates. Where one side of the nose showed heavy plates the same side of the eye showed conjunctival plates, but in one case the heavy colonies were present on reverse sides of the nose and eye. Some cases with distinct nasal pathologic changes and heavy nasal plates showed sterile eye plates. In one case of acute rhinitis with moderately heavy nasal cultures the right eye had thirty-nine colonies and the left was sterile, without any evidence of reaction in either eye.

One case of seasonal toxic dermatitis involving exposed areas, but mainly the face and neck, showed heavy nasal cultures, while the conjunctival sacs were sterile although the eyes were intensely reddened and edematous. This case made a remarkable and prompt recovery on three or four doses of x-ray.

The case noted as *bacillus hemophilæ* is a type of colony which I have isolated several times in pathologic conjunctivitis. In this case the same colony was present in the left nose and left eye and absent on the right side, with no evidence of conjunctivitis.

In one case there was a heavy flat hemolytic streptococcus on the right side of the nose, but both eyes were sterile. The case of *bacillus influenzae* showed the organism present in the right eye and right nose while the left side was sterile, with no evidence of

conjunctivitis. The only case showing mold was probably from air-borne contamination.

### Conclusions

The majority (fifty-seven percent) of normal conjunctival sacs carry one or more organisms on one or both sides, with absolutely no clinical evidence of inflammatory reaction of the conjunctiva, while a minority (forty-three percent) are absolutely sterile, as measured by swab plantings incubated forty-eight hours on blood-agar plates.

The organisms which were isolated in this series all belong to the pathologic group, and are types which are generally considered low in virulence but are of the suppurating variety. The large white colony of hemolytic staphylococcus so characteristic of the nasal flora markedly predominated. From these findings all conjunctival sacs must be considered as harbors of microorganisms unless proved otherwise. This has a decided bearing on possible postoperative infection in otherwise clean incisions into the eyeball, especially in cataract cases.

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I am indebted to my assistant, Miss Theresa Karger, for valuable technical aid in the preparation of this paper.

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## PRIMARY TUMORS OF THE OPTIC NERVE

### Report of a case

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MONTREAL

These tumors are decidedly uncommon. Histologically they fall into three groups, gliomata, meningiomata, and fibromata. The present case is one of meningioma.

Primary tumors of the optic nerve arise in the nerve itself and are of three kinds: (1) Those which arise in the nerve proper, gliomata, and consist of an overdevelopment of the glial tissue. These are the commonest. (2) Those which arise from the meninges of the



Fig. 1 (Mathewson). Photograph of the patient.

nerve, meningiomata. (3) Those which arise from the fibrous tissue of the nerve sheath, fibromata, which constitute the smallest group.

There has been a great deal of confusion in the classification of these tumors, but with newer methods of staining neuroglia the above classification is generally accepted.

In 1912 Hudson published a very exhaustive paper on this subject, in which he discussed 182 cases which he was able to find in the literature. He disregarded the authors' diagnosis, such as fibrosarcoma, psammoma, or myxosarcoma, and allotted the cases according to the foregoing classification from a study of the case reports. By this method he found that 118 cases were gliomatous, 24 were meningiomatous, and 7 were fibromatous, leaving 33 cases which could not be classified owing to lack of data.

In a survey of the literature since 1912 I have found 61 cases, 52 gliomatous, 9 meningiomatous, and 1 fibromatous. Omitting the fibromas we have a total of 203 cases, so that there are 6 gliomas to 1 meningioma.

These nerve tumors are very rare. Hidano of Japan states that with him they occurred twice in 25,000 cases, while Bennett saw one in 35,000 cases. I have only seen two in thirty-five years of hospital and private practice.

As a rule they are easily diagnosed. Proptosis, usually straight forward and without limitation of ocular movement, early loss of vision, and very slow growth make a symptom complex that is characteristic.

This slowness of growth is common to all cases, but in some it is extreme. In Hudson's case proptosis had been noted for fourteen years, and in two

#### GLIOMA

- (1) Occurs at an earlier age. In the 113 cases cited by Hudson the average age was thirteen years.
- (2) Visual disturbance (optic neuritis or atrophy) usually precedes proptosis.
- (3) Limitation of ocular movement is more common and appears earlier.

#### MENINGIOMA

- (1) Occurs generally in adult life or later. The average age in twenty-four cases cited by Hudson was thirty-five years.
- (2) Visual disturbance frequently follows proptosis.
- (3) Limitation of ocular movement is less common and appears later.



others (Baumler and Franke, and Delbanco) for ten years before operation was undertaken.

The benign nature of these tumors is shown by the lack of local recurrence in spite of the fact that the removal of the tumor has been incomplete in at least fifty percent of the cases. Hudson states that in many cases freedom from recurrence has been noted for many years; twenty-four years in one instance and nineteen years in two other instances.

meningioma were in persons in middle life one case occurred at ten years.

The reason why the nerve is affected earlier in glioma is that the nerve fibrils are damaged by the pressure of the overgrowth of the neuroglia, while in meningioma the nerve is only damaged when the tumor is so large that it surrounds the nerve and destroys it by strangulation, which naturally is a very slow process.

With regard to the third point we usually find that the part of the nerve

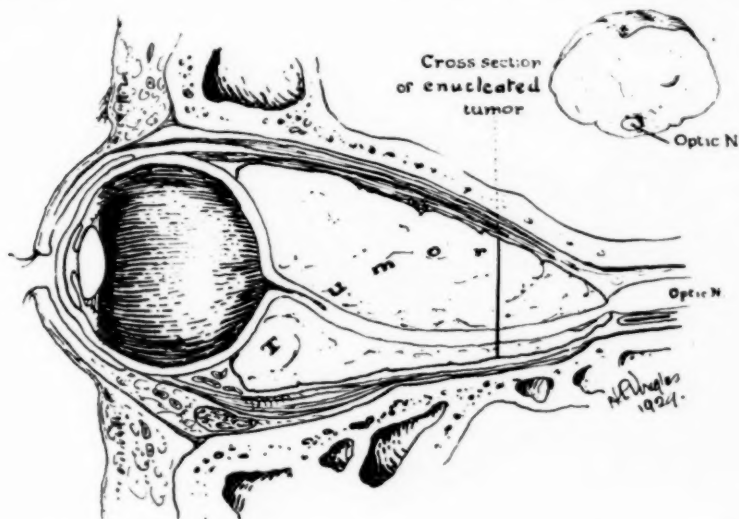


Fig. 2 (Mathewson). Semidiagrammatic drawing to show position of tumor.

While most patients do not die from results of growth of that part of the tumor which was not removed at the time of operation, a certain number certainly do, so that we cannot consider these tumors as entirely benign but must advise early operation in the hope that the tumor can be removed in its entirety.

The question arises as to whether it is possible clinically to distinguish between these forms of tumor. The following table gives some points of differential diagnosis.

With regard to age, exceptions are not uncommon, for while one case of glioma occurred at eighteen months another occurred at sixty-two years. On the other hand, while most cases of

just behind the eyeball is not affected in glioma, while the reverse is the rule in endothelioma.

The case I have to record is that of Mrs. L. B., a French Canadian, forty-seven years of age. She has never had any serious illness. She has three grown-up children alive and well, and has lost four children in early infancy. Her left eye began to protrude five years ago. The vision of this eye began to fail three years ago and has been entirely gone for over a year. She further states that she had not consulted anyone about the eye until April, 1929, when she went to the eye clinic at the Western Hospital, where she was seen by Dr. Bramley Moore.

Dr. Moore had a Wassermann test

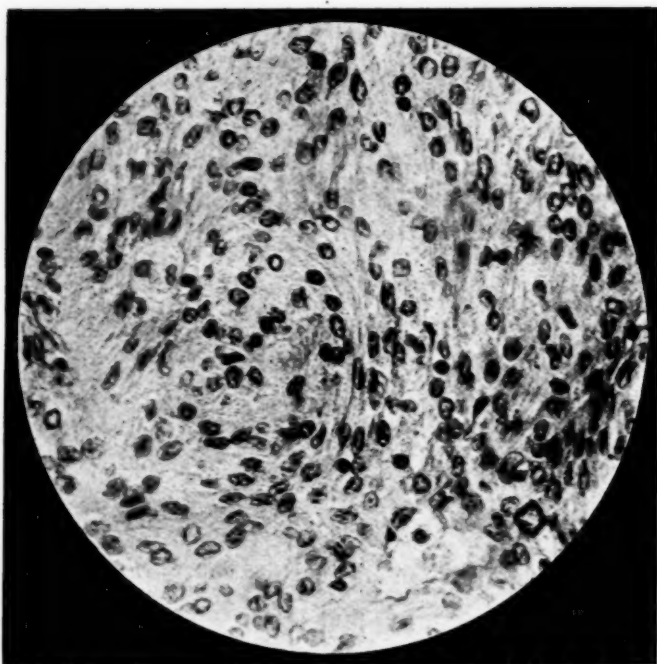


Fig. 3 (Mathewson). Section showing the tendency of the tumor cells to assume a grouping in whorls.

made, which was negative. In spite of this she was given intensive antiluetic treatment for some months, but without any effect on the ocular condition. Dr. Moore then made a diagnosis of tumor of the optic nerve and asked me to operate on her.

When she came to me the left eyeball was proptosed 2.50 cm., but the lids

closed fully over it. The cornea was clear and the fundus could be well seen. The optic nerve was quite atrophic. The vision of the left eye was nil. The eyeball could not be pushed backward into the orbit, and movement was restricted in all directions. I decided to do a Krönlein operation but obtained the consent of the patient to remove the



Fig. 4 (Mathewson). Transverse section through optic nerve and tumor. The arrow points to the optic nerve.

eyeball if I thought necessary. After I had resected the temporal wall of the orbit and exposed the muscle cone, I cut the external rectus, exposing a huge tumor which was attached to the back of the eyeball over an area about 1.5 cm. in diameter.

It was at once evident that this was not a suitable case for the Krönlein operation but, having gone so far, I decided to preserve the eyeball. I separated the tumor from the posterior pole of the eyeball, severed it also at the apex of the orbit, and with considerable difficulty removed it by means of a calculus forceps.

The patient made a good recovery but, owing to the bruising of the nerves and muscles that had occurred in enucleating the tumor, complete ptosis of the left upper lid resulted.

The tumor measured 3.2 by 3.0 by 2.3 cm. Macroscopically a very good idea

of the tumor with relation to the optic nerve and to the orbit is given by the accompanying drawing by Miss Douglas, which is semidiagrammatic.

Microscopically the optic nerve is surrounded by a thin connective tissue capsule, outside of which is a space due to shrinkage and then a thick fibrous coat. In and about this coat there is a tumor mass composed of masses of uniform cells with ill defined boundaries and large vesicular nuclei. There is considerable interstitial tissue, and wide bands of collagen separate the masses in places. Many of the masses have a whorled arrangement. The arachnoid is involved, but not the pia.

The photomicrographs give a good idea of the structure of the tumor. I have to thank Dr. Rhea for these and for the pathological report.

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## RAT BITE OF EYELIDS RESULTING IN RAT-BITE FEVER

CHARLES M. SWAB, M.D.  
OMAHA

The patient, a negro boy of eight years, was bitten by a rat on both lids of the same eye, and two weeks later developed an intermittent fever with swelling of the affected eyelids and of the same side of the face, and also swelling of the cervical glands. Recovery was rapid after administration of neosalvarsan. No exanthem was observed. From the department of ophthalmology, Creighton Medical College. Read before the Omaha-Douglas County Medical Society, Omaha, April 8, 1930.

In the annals of general medicine as early as 1840, when Wilcox<sup>1</sup> recorded such an instance, one encounters references to wounds due to rat bite. This case report, according to Lanford<sup>2</sup>, was the first published comment on the condition. It has remained however for the observations and studies of other physicians in later times to establish the fact that rat-bite fever is a definite clinical entity. Most of the credit for this discovery is given to Miyake<sup>3</sup> of Japan, who published an extensive report on the subject in 1900, basing his conclusions on eleven cases which he had studied personally.

The routine diagnosis of rat-bite fever usually follows the several physical findings in a case due to the bite of a wild rat. Briefly, these symptoms develop after an incubation period of from ten to twenty-seven days and consist of the following: a skin wound that heals promptly and then breaks down, the lesion being surrounded by an area of swelling and redness; an exanthem consisting of macules and papules which develops most frequently upon the trunk and extremities; a peculiar intermittent fever which runs from three to seven days, then alternates with an afebrile interval of two or three days; a nonsuppurative inflammation of the regional lymph glands, with or without lymphangitis.

In 1914 Schottmüller<sup>4</sup> describes the streptothrix muris ratti which he had isolated from a patient who had been bitten by a rat. To this organism he ascribed rat-bite fever. Two years later Blake<sup>5</sup> reported a case with additional studies that confirmed the claim of Schottmüller. Futaki<sup>6</sup> and his asso-

ciates in the same year isolated from cases of rat-bite fever a spirochete which they designated spirocheta morsus muris. The last-mentioned work has been substantiated by the studies of other physicians in Japan, Europe, Mexico, and the United States. These reports are so convincing that Dickin-son<sup>7</sup> feels assured that the probable cause is the spirochete, while the streptothrix is a secondary invader. He even adds that the isolation of the spirocheta morsus muris is not essential in making the diagnosis.

Among the recorded cases that have been reviewed none has shown any ocular involvement. The following case report is therefore presented in view of its seeming rarity.

**Case report:** B. H., a negro boy six years of age, was admitted to the Douglas County Hospital January 10, 1930. He had been bitten on the eyelids of the left eye by a rat on December 11, 1929. Two weeks later, on Christmas day, his eye became swollen and there was also some swelling of the left side of his face. Within a few days the swelling was so pronounced that the left eye could not be opened, but there was no pain. He had been feverish at intervals after the appearance of the swelling. Past history was essentially negative.

**Examination:** Aside from a very marked apathy there seemed to be very little general disturbance. Temperature 100.4° axillary; pulse 104; respirations 24. The left eye was swollen shut and the patient could not open his lids. The swelling was edematous in character. At the outer canthus there were two depressed marks in the lid skin, one



in each lid. The mark in the upper lid resembled the impression of a rat tooth and was fully healed. The lower lid wound was covered by a rather heavy crust, which on removal disclosed a fully healed skin lesion similar to the one in the upper lid. The conjunctiva was somewhat edematous and injected, but there were no ulcerations or other signs of inflammation. All other ocular structures were entirely normal. There was marked firm swelling of the anterior cervical lymph glands on the left side, extending high up in the parotid region. Other physical findings were negative. There was no skin eruption. Urinalysis, negative. Blood count: 4,800,000 erythrocytes, 10,500 leucocytes with 70 percent polymorphonuclears, hemoglobins 85 percent. Through misdirection of the order, a Wassermann test was not made.

Course and termination from progress notes: Salicylates and hot compresses were employed during the first twelve hours in the hospital. At the end of this period the temperature had dropped to ninety-four degrees. The glands had subsided slightly in size, and there was a suggestion of fluctuation. Hot packs were discontinued and an ice bag was applied to the affected side of the face and jaw. The temperature curve ranged from 94 to 98 degrees for forty-eight hours. Dr. William Barry of the pathological department was consulted in regard to additional laboratory studies. Accordingly, a blood culture was made by him and also an agglutination test with the bacillus tularensis. Both of these studies were negative. None of the gland tissue was removed for dark field studies or for injection into experimental animals, as the risk did not seem justified. On January 14, the temperature mounted to 102 degrees. On account of the danger of intercurrent infection at this time, Dr. J. Harry Murphy of the pediatric service ordered one-tenth gram neosalvarsan intravenously. Next day the axillary temperature was 104.4 degrees, but after a few hours it fell to 96 degrees. With each succeeding day in the hospital there had been some improvement.

After the administration of the neosalvarsan, recovery was still more rapid. On January 17, the leucocyte count was 4,000 and there was a five percent increase in the hemoglobin in comparison with the previous determination. The patient was discharged at the end of sixteen days with only slight edema of the lids and no glandular swelling.



Rat-bite fever (Swab). Appearance of patient twenty-four hours after admission to the hospital. Note swelling of anterior cervical glands.

#### Comment

The recovery of the patient was so rapid after instituting arsenical treatment that further efforts to isolate a causative organism were useless. Dickinson states that the response to arsenical therapy is almost diagnostic. The absence of an exanthem is seldom mentioned in the published accounts of rat-bite fever. While the exanthem adds a link to the diagnostic chain, its presence is not absolutely necessary to establish the diagnosis. In reviewing the recorded cases no mention of the disease as occurring in the negro race has been found. It seems probable that an atypical rash, that is, one which was predominantly macular, would not be discernible in a negro. The experi-

mental investigations of Bayne-Jones<sup>8</sup> indicate that rat-bite fever does not give a positive Wassermann reaction.

When first seen this case was suggestive of oculoglandular tularemia. 1316 Medical Arts building.

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## CONDYLOMATA AT THE INNER CANTHI

### Report of case

EDWARD BELLAMY GRESSER, M.D., F.A.C.S.

NEW YORK

In addition to the condylomata at the canthi, there were manifestations of secondary syphilis in various other parts of the body. From the departments of syphilology and ophthalmology, Bellevue hospital.

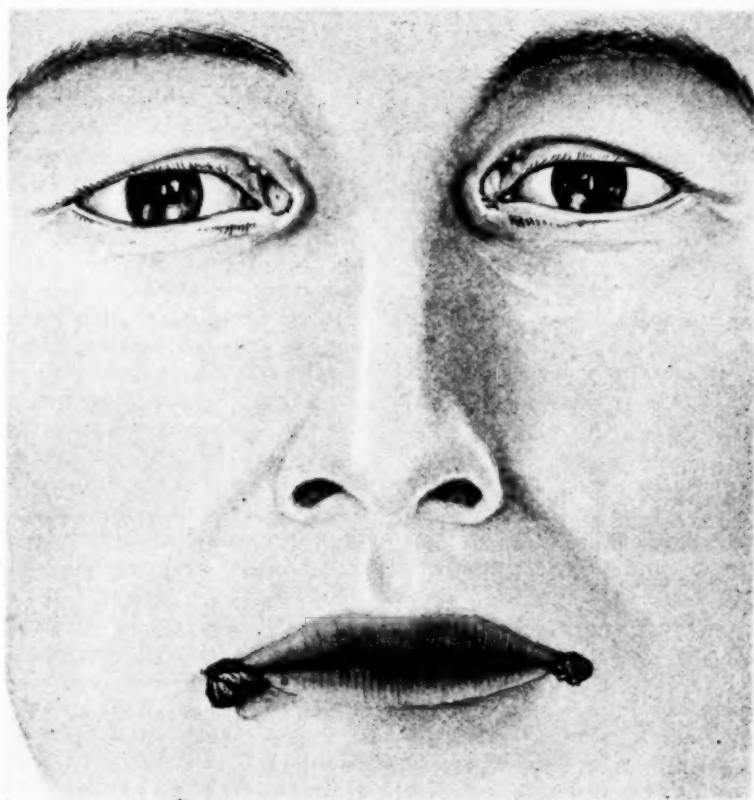
It is a well known fact that syphilis may affect any part of the body, and the eyes and its appendages are no exception to the rule. A careful survey of the literature revealed no specific reference to condylomata of the inner canthi excepting a passing remark about the rareness of these lesions.

Hazen states: "The various syphilodermata are rare, though at times any one of them may occur, the usual site being at the fold and corner of the upper lid". Marshall makes the following brief reference to this subject: "Mucous patches and ulceration may occur along the edges of the eyelids and on the moist conjunctival surface adjoining. These are rare, but differ in no respect from the mucous tubercles seen in the mouth or on the lips". Morrow says: "In the eyelids we meet with four varieties of syphilitic lesions, viz.: 1, the chancre or initial lesion; 2, papules or tubercles, the so-called tubercular syphilides; 3, rupial ulcerations; and 4, gummata. They are all generally met with in the lower lid, along the edge of the lid, and at both canthi. They are rare manifestations of constitutional syphilis."

It is needless to say that the commonest locations for syphilitic condylomata or moist papules are the genito-anal regions, angles of the mouth, in the axillæ, and under the breasts of stout women. Occasionally the umbilicus and interdigital spaces of the toes may present condylomata.

This unusually interesting case was presented at the Manhattan Dermatological Society on February 11, 1930, by Dr. Mihran B. Parounagian, and is herewith reported through his courtesy after presentation before the ophthalmological section of the New York Academy of Medicine on February 17, 1930.

**Case report:** Mrs. A. S., aged thirty-nine years, was admitted to the service of Dr. Parounagian on February 11, 1930. There was a history of extra-marital exposure four months prior. She presented a fading roseola on the body, annular syphilides about the mouth, condylomata of the inner canthi and nasolabial junction and "split pea" papules at the angles of the mouth. There were also condylomata in the genitoanal regions, at the umbilicus, under both breasts, in the axillæ and



Condylomata at the inner canthi (Gresser).

in the folds of the elbows. Mucous patches were present in the throat. These conditions were of one month's duration. The Wassermann reaction was four plus. The eyeballs were unaffected externally or internally.

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## HISTORIC MEMORABILIA REGARDING THE VISUAL FIELD AND PERIMETRY

HOWARD McI. MORTON, M.D., F.A.C.S.

MINNEAPOLIS

The author passes in review some high lights in the history of knowledge with regard to visual fields and perimetry, in the course of the past two thousand years.

Encompassed by the demands and confusions unavoidably associated with daily clinical experiences, the ophthalmologist has little leisure to study the backgrounds and the traditions connected with much of his routine performance. However, there is real interest in the study of historic and traditional backgrounds, and these oft-times give to the picture a setting that relieves it of much of its monotony.

With this thought the author has garnered a few notations of primitive or early concepts related to the visual field. There seems to be no comprehensive historical monograph or text dealing with the evolution of knowledge of the visual field, the early appreciation of normal manifestations or of changes from the normal, and the evolution of the perimeter and related methods of testing. From certain more or less disconnected sources, the writer will endeavor here to bring together briefly some such historic perspective of visual field conceptions and of the art of perimetry.

Although they attained to conspicuous eminence in science and the arts, one is unable to find indications that the early civilizations existing between the Tigris and the Euphrates, or along the Nile, had any worth-while conceptions regarding the visual field. It is, however, interesting to observe that, as early as the end of the second century of the Christian era, Galen, in his "Anatomy and physiology of the eye", displayed a surprisingly clear mental picture of the visual field.

In chapter 12 of Galen's treatise one finds the following expositions, which are truly remarkable when considered in the light of his time. He writes: "Suppose one of the two eyes is gaz-

ing at a circle, which is called the 'center', let there be conceived a straight line running as far as the pupil which is looking at it. This should be, I say, not an angular line, or a bent one, but one like a thin hair or spider's thread, passing from the pupil to the center of the circle, therefore absolutely rectilinear. Further, let us suppose that there are, in addition, a multitude of lines which pass from the pupil to the line which bounds the circle (which is also called the "periphery"), they also perfectly straight, like thin gossamer threads, each made tight in its turn. Then we will call the figure which is bounded by these lines which run straight to the circle a 'cone', the pupil being the apex of the cone, the circle the base. The line running straight from the pupil to the middle of the circle we will call the 'axis'. Further, we will imagine a millet grain or other small body to be placed upon the axis, which extends through the air from the pupil to the circle's center. Then the center of the circle will be, as it were, covered, and the pupil prevented from seeing it. As soon, however, as it is taken away, either entirely or merely moved to one side, then the circle will be visible again. When one understands this he will easily comprehend that every object, in order to be visible, must lie on the straight line which may be conceived as running from it to the eye".

In this primitive though clear expression of central and peripheral vision projected into the visual field I have found great pleasure, since it is the earliest that I have been able to trace in the literature.

Magnus (Die Kenntniss der Sehstörungen bei den Griechen und Römern, Graefe's Archiv, v. 23) tells us that



the early Greek and Roman physicians and naturalists had conceptions regarding the visual field, and also some knowledge of the relationship existing between disease processes and field changes. They believed that the lens, not the retina, was the organ of sight, that from the lens the element of light emanated to the object, and that in this manner vision was explained.

Euclid elucidated the principle that space seen was a cone whose base was a plane passing through the object, and whose apex was at the middle of the pupil. Within this cone everything was seen, but not equally sharply or distinctly. To obtain this distinctness (central visual acuity) one must allow all of the outpouring light stream from the pupil to fall directly upon the object.

Here was an early appreciation of the distinction between central and peripheral vision. Heliodor of Larissa also made this distinction, stating that central vision was on an axis, the central axis of the cone of vision, that is, the visual axis.

Hippocrates was familiar with half-sided visual defects (hemianopsia), and recognized their relationship to underlying disease conditions. Galen knew of the occurrence of scotoma, peripheral contraction, and hemianopsia.

At this early period the ancients had no true conception of the significance of these phenomena. It remained for a much later period to establish anything regarding the relationship between field manifestations and their physical, physiological, and pathological foundations, and so to establish their value in diagnosis. Through the observations of astronomers and mathematicians were evolved conceptions regarding the extent of the field in degrees, both in the vertical and in the horizontal meridian. Arago found that the extent of visual perception from the horizon toward the zenith was about forty-five degrees, while Venturi's studies indicated that in the vertical meridian the extent of the field was about 112 degrees and in the horizontal meridian 135 degrees.

After this came the long sleep of science and art, and it is a far cry before, in the middle of the seventeenth century, we again find an intelligent reference to this subject. Possibly in this long interim—and it is not an improbability—there may have been references of a more or less vague and indefinite character. However that may be, in the year 1616 a remarkable man by the name of Mariotte, a French priest and eminent physicist, discovered that the eye possessed a blind area, due to lack of visual function at the optic papilla. Mariotte was called to London, and there demonstrated the blind spot before the English king.

Again we find an apparently considerable interval in which little was done along this line of investigation, until in 1800 Thomas Young read his famous paper on the "mechanism of the eye" before the Royal Society. In this, Young developed the science of perimetry almost "full-fledged and fully armed", as far as fundamentals were concerned, and showed that he possessed a remarkably complete conception of the subject.

The life history of Thomas Young is one of the most interesting and remarkable among the biographies of scientific men. His mind seems to have had a protean capacity for grasping many different subjects, from the field of optics, in which he perhaps stands preeminent, to the deciphering of Egyptian hieroglyphics. He was, fortunately, a man in affluent circumstances, and, though a failure as a practicing physician, his name is immortal in the field of science.

In 1676, long before the time of Young, Willis had referred visual field defects to pathologic changes within the eye, and later the immortal Graefe—who seems almost to have left nothing unstudied and untried in the field of ophthalmology—indicated the importance of a study of perimetry in the diagnosis of eye disease as well as in general diseases. This was about the year 1856.

The next step along this pathway carries us to the year 1868, when För-

ster presented the first perimeter, as we understand such an instrument at the present time. It may be supposed that whatever conceptions were gained before the year 1868 were not obtained through the use of a perimeter. Yet the implication is clear that diseases within the eye or posterior to it, affecting parts of the perceptive or transmitting apparatus of vision and displaying themselves in the field, were probably discovered and studied on flat surfaces, such as screens or blackboards.

Förster's perimeter was, in all its fundamentals, the perimeter of today. The radius of the arc had a length of twelve inches, and on this were marked the points of appearance and disappearance of a bit of white paper one-fourth of an inch square, attached to a piece of black foil. At the same time Förster described a chart for recording the results obtained, which indicated that he had very full knowledge regarding the extent and configuration of the visual field and the position of the blind spot of Mariotte.

It is quite unnecessary to describe the innumerable perimeters that have been devised since that time. The fundamental principle of a curved surface

corresponding to the retinal curvature, upon which the projected field is studied, holds in all of them. The mechanical features for the movement of the test object and for registration of the results upon the chart have been gradually improved to a very high degree.

That "there's nothing new under the sun" is well confirmed by the historical study of perimetry. Much that we today accept as recent accretion to the body of our knowledge on perimetry has been done, and well done, before. The great master Graefe had already observed and studied the peculiar central field expressions of glaucoma, and had found, even then, the "Rönne symptom", the Bjerrum scotoma, and probably many other central changes that have since been rediscovered and reaccentuated.

The modern perimeter and the Bjerrum screen have, however, made the art of perimetry a more common possession, and more readily available as a routine procedure. The work of Haitz, later greatly improved upon by Lloyd, has made possible the greatest refinement in central field study, by recognition of the binocular principle.

*418 Insurance Exchange building.*

## COLOR PHOTOGRAPHY FOR IMPROVED TEACHING OF OPHTHALMOLOGY

LAURANCE D. REDWAY, M.D.  
NEW YORK CITY

The possibilities of color photography for the purposes of clinical teaching, both undergraduate and postgraduate, are emphasized. Once adequately recorded by this method, the material is available whenever needed. From the research laboratory of the department of ophthalmology, Beth Israel Hospital, New York.

Since the publication in 1929 of the author's simplified technique of instantaneous color photography of the living human eye<sup>1</sup>, much interest in this subject has been stimulated among both ophthalmologists and anthropologists.

The technique is so simple that it is practicable for anyone to make good color records. The cost is very low. Sufficient detail is obtained for students viewing the projected transparencies to obtain as good an idea of the pathology of the normal structure of the anterior segment as they would by examining the patient in the clinic. Apparent stereoscopic relief is obtainable in a single picture, thus doing away with the necessity for cumbersome stereoscopic viewing apparatus. A lecturer in ophthalmology can avail himself of the color records to illustrate his didactic work, and, irrespective of what material happens to be in the clinic at the time, he may have at hand exactly the proper records to illustrate his subject.

As compared with Europe didactic ophthalmology in the United States suffers from a too widely scattered hospitalization of clinical material. Especially in the field of postgraduate teaching is this discrepancy noticeable. Much valuable material from a teaching point of view is daily going to waste because of failure to record it adequately. By adequately is meant pictorially, in color. For, in the opinion of the author, properly to record in color ophthalmic pathology both of the anterior segment and of the fundus, so that the records shall later be of use for teaching purposes, certain fundamental conditions must be met.

1. Size: Picture records in color must show the eye at least natural size, but preferably slightly larger, so that

a person viewing the picture either at fourteen inches by direct inspection, or at a greater distance by projection as in classroom work, may see the eye to at least as great advantage as in a clinical examination.

2. Detail: Detail is of the greatest importance. It must exist in the picture up to the limit possible to record within the scope of the materials utilized. The ordinary color screen-plate, as the author has proved, is capable of recording fine details far in excess of the usual requirements, and often exceeding those seen under conditions of clinical examination. This paradoxical statement is explained by the fact that in making color screen-plate pictures, a very intense focalized illumination (arc) is used. Such an intense light penetrates partially opaque structures in a manner not possible to duplicate for direct observation in the clinic, especially in highly light-sensitive eyes.

3. Illumination: The subject should ordinarily be lighted from the side at from thirty to forty-five degrees from the plane perpendicular to the iris. Thus the ordinary conditions of clinical examination are maintained, the shadows occur in their normal places, and the usual sense of plastic relief is realized.

So great an illusion of reality is obtainable if these simple conditions are met, that in a great many instances the pictures are actually more satisfactory for teaching purposes than the patient in the clinic would be. For example, a case of acute congestive iritis is to be demonstrated to a group of fifteen students. The patient is restive, the dark cubicle is hot and stuffy, the patient's eye, even anesthetized, is light-sensitive, there is excessive tearing and blepharospasm. Possibly two of the

fifteen students may have the opportunity of examining the pathology in sufficient detail to derive much benefit from the experience before the patience and endurance of observers, instructor, and exhibit give way to the imperative need for return to normal bodily temperatures, for renewal of oxygen supplies, and for avoidance of claustrophobia. The whole scene is one more appropriate to a session of the Spanish Inquisition than to clinical teaching in supposedly modern times. And who will arise to say that this picture is overdrawn?

Suppose on the other hand that the same patient is taken by the instructor, photographed once or possibly twice, each picture consuming  $1/25$  of a second; photographed with the eye placed in relation to the camera lens and to the focal illuminant in such a way as best to show the engorged vessels of the iris, the spasm of the circular fibers, and so on, with practically no inconvenience to the patient and the sacrifice of very little time by the instructor. What is the result? A record true in color and detail, showing exactly the desired pathology; a record utilizable immediately and at any time thereafter for instruction of any particular student group; a record which can be projected in the darkened class-room or amphitheater when, with reasonable comfort for instructor and students and with no discomfort for the patient, the eye can be demonstrated with the assurance on the part of the instructor that each student is seeing in their accustomed relationships all the pathologic details he wishes to impress on their minds.

Not only may the same patient be photographed at successive intervals to record the chronologic sequence of the pathologic states of the living eye, under treatment, or without treatment; but also, by the use of certain vital stains, otherwise invisible lesions may be demonstrated or microchemical reactions shown under more favorable conditions than are possible in the clinic. These pictures constitute a permanent record, a library of them being independent of that "fell clutch of cir-

cumstance" so often experienced when human clinical material is the sole reliance of the instructor, and he must perforce demonstrate not what he would like to show but what at the time happens to be available. There seems to be no good reason why, with modern teaching adjuncts available and certainly well within the means of any medical school or hospital, the clinical instruction of undergraduate students should not be bettered and the value of the instructor to the student body be enhanced.

It is not by any means advocated that clinical examination of human material shall give place to instruction based on color photographs, but merely that by this means students shall be given a preliminary visual familiarity with the clinical pathology they will later encounter. A didactic preparation of the kind here suggested will have the very great advantage that students can be inducted in the art of making their clinical examinations when already fortified and prepared with a very definite visualization of the pathology they may expect to find. Certainly, with such an end in view, the effort of making careful clinical color photographs of pathologic eyes is worth while, to say nothing of the value as records which such photographs would have as supplements to the usually inadequate graphic notations.

But, if the usefulness of such color photographs might be great as applied to the preclinical teaching of undergraduates, how much more might be said as to their utility for postgraduate instruction? The author feels it to be a matter of general acceptance that the clinical aspect of postgraduate instruction in ophthalmology in this country is at least susceptible to improvement, not to put it more strongly. While much emphasis has been laid on the postgraduate teaching of improved operative technique and methods, and much ingenuity and money have been applied in modernizing methods of instruction in surgery, the utilization of clinical material for the training of the future ophthalmologist may still be re-



garded as medieval in its efficiency. Granted that new methods of perimetry, improved slit-lamp practice, and better methods of pathologic, bacteriologic, and chemical investigation are available, the instructor of postgraduate students is still at the mercy of the available human material. The great bulk of this material persists in being commonplace. As to the unusual cases, the atypical variants, the education and experience of the instructor, his ability to impart his knowledge, may be of the best, but may yet be largely ineffective in the absence of suitable clinical material.

What of the practitioner who at really very great cost to himself deserts his practice to avail himself of postgraduate clinical instruction? Respecting surgery, the treatment of hospital cases, he may be amply repaid, but as to instruction in clinical ophthalmology he might just as well have remained, with a few exceptions, in his own office; for he will see about the same run of cases, unless by chance during his period of instruction some of the more unusual clinical material happens into the out-patient department. Yet it is safe to say that in a period of five years, if the out-patient department in question is of any size, an enormous

quantity of interesting clinical pathology has passed through it almost unrecorded, almost unpreserved, and therefore almost useless for teaching purposes.

At the present time there exists no reasonable excuse for failure to preserve for teaching purposes the ordinary and the extraordinary clinical material passing through the ophthalmic services of the teaching hospitals. A practical workable camera at reasonable cost is obtainable from one of the leading makers of optical instruments; a high degree of skill is not necessary to operate it; the cost of operation runs no higher for color-plate work than for ordinary black and white photography if small-sized plates are used; the color plates, as the author has repeatedly demonstrated, are capable of the highest degree of color and detail reproduction. So that merely a little enthusiasm, merely the desire to better for the sake of betterment the teaching of clinical ophthalmology is necessary to place such teaching on the plane of a fine art, well and comprehensibly illustrated by an ever expanding and living library of clinical variants available at all times for the uses of students of ophthalmology.

*285 Madison avenue.*

#### Reference

- <sup>1</sup> American Journal of Ophthalmology, 1929, v. 12, Sept., p. 711.

# SOCIETY PROCEEDINGS

Edited by DR. LAWRENCE T. POST

## NEW ENGLAND OPHTHALMOLOGICAL SOCIETY

March 18, 1930

DR. SYLVESTER JUDD BEACH presiding

### Stitch flap in cataract operation

DR. F. H. VERHOEFF showed a patient from whom, one week previously, he had removed a cataract in its capsule, and had sutured the wound with three sutures. The wound was completely covered by a conjunctival flap held in place by the sutures, each of which passed through corneal and scleral tissue and the conjunctiva.

### Removal of foreign body from vitreous with forceps

DR. F. H. VERHOEFF showed a boy who, in October, 1927, had been struck in the right eye when a dynamite cap exploded. He was admitted to the hospital two hours later with a small wound in the sclera. X-ray pictures showed a minute foreign body in about the center of the eye which, with the ophthalmoscope, could be seen suspended in the vitreous. As a dynamite cap of the same kind had solder in it, a reflection from the foreign body in the eye might perhaps be solder. It had been decided to leave the foreign body there as long as it was giving no trouble and there was no exudate collecting around it, the patient to return frequently for observation. Recently, after an absence of eighteen months, he came to the hospital with a beginning cataract and increased vitreous opacities. The foreign body could still be seen suspended in the vitreous. Vision was cut down to 20/70.

After dissecting a conjunctival flap, Dr. Verhoeff made an incision about four millimeters long just anterior to the superior rectus muscle. Almost no vitreous came out at the time of the incision. He then adjusted a pair of forceps so that they could be opened

widely at the end. With the ophthalmoscope in the right hand, and the forceps in the other, he finally got near the foreign body and found that it followed the vitreous which was in the grasp of the forceps. Withdrawing the forceps, he brought out a small amount of vitreous containing the foreign body. It was now a week since the operation and the eye was healing well, but the vitreous was somewhat more cloudy than it was before operation. The foreign body was black, smooth, less than one millimeter in diameter, could be cut through with a knife, and was insoluble in concentrated acids and alkalis. Its exact nature was not yet determined.

This was the second foreign body Dr. Verhoeff had removed in this way. In the first case he grasped the foreign body, a particle of copper, with the forceps after several attempts. The vitreous tended to make the foreign body slip away from the forceps.

### Case of intraocular foreign body in the vitreous for one year

For DR. J. J. REGAN, Dr. E. B. Dunphy presented a twenty-three year old mechanic. In the course of an ordinary examination, Dr. Regan noticed a small whitish mass near the retina at the nasal side of the disc. It was found that the patient was struck in that eye while hammering steel one year ago. X-ray showed a foreign body in the eye, 2 by 1 by 1 centimeters, to the nasal side and fifteen millimeters back. The man had had no discomfort with the eye. Apparently there was no siderosis. He had 20/20 vision. The foreign body had been in the vitreous for one year. The question was whether to leave it alone or to operate.

*Discussion.* DR. F. H. VERHOEFF felt that there would be very little chance of getting the foreign body out, and trying to do so would endanger the sight of the eye.

### Pulsating exophthalmos

DR. W. E. KERSHNER reported the case of a patient who, ten years ago, had consulted the family physician for sharp pains in the left side of the head of only a few seconds duration. The family physician had found nothing abnormal. On examination, March 12, 1920, both eyes had vision of 6/5 with a small cylinder. There was no change in the conjunctiva, media, or retina. Tension was normal. A week later the left eye felt stiff, and there was a slightly chemotic conjunctiva and a suggestion of fullness of the veins of the fundus. The fields of vision for each eye were normal for form and color. The movements of the eyeballs were normal. The pupils reacted to light, accommodation, and convergence. Nothing was found in the ears, nose, or teeth which would throw light upon the subject. Diagnosis at that time was tenonitis. By March twenty-fifth, chemosed conjunctiva was presenting between the lids. There was a beginning proptosis. Pupillary reaction was not prompt. The retinal veins were full and tortuous.

The whole process increased in severity till April ninth, when the staff inclined to a diagnosis of tenonitis from ethmoid infection. The veins of the fundus increased in fullness and there was beginning swelling of the nerve head. There was no elevation of temperature or pulse, no pain nor leucocytosis. The right eye began this same process on April twentieth. An effort was made to find pus behind the globe. Nothing of significance was discovered by the rhinologists or neurologists. But by May fifth, the condition of both eyes was about the same, except that the right nerve head was but slightly affected, the right pupil and globe less firmly fixed. May fifteenth both globes seemed to have retracted slightly.

On the night of May twentieth the patient heard a blowing sound. On the morning of the twenty-first he presented distinct pulsation over both eyeballs, which could be clearly seen and heard in any part of the head. From

this time on, the blowing sound was constant but gradually became less loud. The constant noise upset his nervous system for quite a period, but he pulled himself together and faced the noisy future with rather remarkable fortitude. He declined operative procedure. Intermittent pressure over the carotid became unbearable so that all efforts toward alleviating his symptoms through treatment were abandoned.

He refused to become a shut-in and began to work around with his flowers and hens. The noises must have gradually become very faint, for on March 10, 1923, he reported that he had had absolutely no noise for two days. At this time Dr. Kershner could neither feel nor hear any evidences of pulsation. There was, some weeks later, a return of the sound rather faintly for about a day, either during or following a slight cold. From that time until now he had had no evidence of the noise. If he overexercised somewhat he felt a fullness in the head, general in character, which left him in a day or so.

Upon examination on February 1, 1930, one could imagine that the veins of the temples, forehead, and upper lids were slightly more prominent than in the average subject of his years. Upon looking at the patient one would receive the impression of a constant convergent squint of the left eye of about forty-five degrees. Both eyes were more prominent than before the sickness. The right showed normal excursions in all directions except externally, where it rotated very little beyond the median line. There was neither nystagmus nor tonic spasm to indicate undue muscular tension. The conjunctiva of the lids was thick and velvety. The vessels of the bulbar conjunctiva were somewhat engorged. The anterior chamber and media were normal with about half of normal pupillary reaction to light and convergence. The fundus showed a clear nerve head, large physiological cup and no evidence of exudate on the nerve head. The arteries and veins as they passed over the nerve head were about equal in size and the arteries were nearly the color of the veins.

Terminal arteries were not tortuous and there were a few of the usual signs of arteriosclerosis. Pressure on the globe did not cause pulsation in either the arteries or the veins. The macula was heavily stippled and deep in color, as was the fundus, which presented a velvety appearance. The vision was 20/20, minus three, without glasses; 20/20, with glasses, with plus 0.37 cylinder axis 45 degrees.

The left eye showed more limited excursion externally, lacking about twenty degrees of coming to the midline. The lids, conjunctiva and media were the same as in the right eye. The nerve head was pale with evidences of exudate partly burying the vessels and obscuring the lamina cribrosa. The vessels of the fundus were heavier and more tortuous than in the right eye with the same thick velvety and heavily stippled fundus.

#### Trichinosis and the eye

DR. THEODORE L. TERRY said that thirty-five cases of trichinosis involving the eye had been seen in the last five years in the Massachusetts Eye and Ear Infirmary. He undertook a general discussion of the subject, giving numerous references to the literature. Edema of the lids had been a very common finding.

With the invasion of the extraocular muscles, there was often pain on moving the eyes, edema of the conjunctiva over the muscles, diplopia, edema of the orbit, and in some cases exophthalmos. In one case paresis of accommodation and mydriasis were noted. In another case there were fresh retinal hemorrhages and optic neuritis which subsided as the general symptoms of trichinosis subsided, but since these findings occurred in only one case they could hardly be included as part of the disease. No parasites had been found in the iris, ciliary body, retina, optic nerve, or choroid.

Cases have sometimes been mistaken for typhoid fever, muscular rheumatism, acute respiratory infection, acute accessory sinusitis, and dermatomyositis. The presence of eosinophilia is an

essential factor in the diagnosis. G. W. Bachman of Johns Hopkins has found a specific precipitation reaction and a specific skin reaction to trichinella protein. Absolute diagnosis is made by finding the adult male nematodes in the stool, free larval forms in the blood or spinal fluid, or encysted larvæ in the striated muscles.

As to treatment Dr. Terry said that a purge was of value even late in the disease, since more than one gestation of the organism was possible. The purge would sweep out any adult male worms that still remained. Salvarsan intravenously in the stage of general infection might destroy the larvæ free in the blood stream. Any other treatment was entirely symptomatic. Prophylaxis was, of course, the rational basis for control of the disease.

*Discussion.* DR. H. B. C. RIEMER said that his interest in trichinosis had been attracted by Dr. Verhoeff's teaching. We did not appreciate the mildness of some of these cases. Some cases at the infirmary were so mild that when referred to the Massachusetts General Hospital the diagnosis was scoffed at. The diagnosis of all of these proved to be trichinosis. The symptoms might be very slight, that is, no muscle pains and no fever, but the edema coming from behind forward over the rectus muscle was entirely different from any other edema we saw in the eye. The severity of symptoms depended on the number of encysted trichinæ in the meat consumed.

Dr. Riemer reported the case of a fireman who was being treated as an industrial case for burn of the conjunctiva. He recognized it at once as a case of trichinosis and sent the man back to his physician for blood examination. Thirty-five percent eosinophiles confirmed the diagnosis of trichinosis.

He also described the case of a nurse with edema of the lids and bulbar conjunctiva. He told her immediately that she had been eating pork and had trichinosis. She wouldn't believe that this was what caused her symptoms. She was about to begin a nursing case and asked whether she could do it. On be-



ing advised she might try but probably in two or three days would be very uncomfortable, she went on the case. She stayed only three days on account of pains in the legs and back. She was unable to go up and down stairs, so had to give up the case and go home to bed herself.

In getting data on this subject at the Medical School Dr. Riemer learned of a rabbit that was born in the laboratory and was not known to have come in contact with any animal that was infected with trichinosis. When the rabbit was killed the autopsy showed, after microscopic examination of the tongue, encysted trichina in the tongue muscle. They were unable to explain how this rabbit who had been fed nothing but vegetables had become infected with trichina.

DR. S. J. BEACH cautioned against making the diagnosis of trichiniasis in all cases of edema of the lids accompanied by fever where no other cause for the edema could be found. He referred to a case so diagnosed in which epistaxis had been a prominent symptom. In days before the Widal reaction, epistaxis with fever at once led to the suspicion of typhoid. In this case, very likely, a more thorough examination would have shown the patient to be suffering from typhoid fever rather than trichiniasis.

S. J. BEACH,  
Reporter

## OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM

London, England

April 3, 4, and 5, 1930

(Jubilee Meeting)

MR. LESLIE PATON, president

### Presentation of Nettleship medal

The president presented the Nettleship medal to MISS IDA MANN for her investigations into the embryology of the eye; this work has extended over ten years.

### Factors controlling ocular position and movements

MR. LESLIE PATON said that in man and other animals with frontally placed eyes and binocular vision, the retinal stimuli played a predominant part in the control of the position and movements of the eye. In lower types of mammal and in other animals with laterally placed eyes other factors gained greater prominence and the most important of these were the reflex stimuli originating from the labyrinth and from the neck muscles. These factors were also present in man, but they were not so easily made manifest, though when their proper functioning was interfered with, signs and symptoms resulted which were often of grave importance and usually difficult to interpret. Among the most important of these signs and symptoms were vertigo, nystagmus, and nausea or actual vomiting. These lower controls were best studied in the rabbit or guinea-pig. The basic nature of the labyrinthine structure giving rise to this control remained constant throughout the animal kingdom, from the simple statocyst of the invertebrate to the complex organ of Corti in the human ear. Histologically it was built up of oval or goblet-shaped cells with projecting sensory hairs lying in a framework of supporting cells and supplied from a plexus of underlying nerve fibers. Functionally these were in a state of constant unsleeping activity and the strength of the stimuli sent out from them varied inversely as the pressure on them. The pressure was transmitted to the hairs by simple otoliths, otolithic membranes, gelatinous capsules or membrana tectoria. These all lay in a fluid which, in the case of fishes, might be in direct continuity with the water in which the animal swam. The pressure might be varied by gravitation as in the case of the sacculus and utricle or by movement, either progressional or rotational as in the case of the semicircular canals, or vibrational as in the case of the organ of Corti.

The determination of the position and movement of the eyes was only a small

part of the function of these organs. Their most important function was the maintenance of equilibrium and of the tonicity of the body musculature. The classical experiment of Kreidl with the crustacean *Palæmon* exemplified the mode by which equilibrium was maintained. When in this animal small grains of iron were substituted for the normal otoliths, the equilibrium of the animal was determined by magnetic attraction, instead of gravitational attraction. In fishes, the need for maintenance of equilibrium was met by the elaborate mechanism of labyrinth, side-line organ and head canals. Here there was no acoustic mechanism but an extremely delicate reflex response to very slight variations in fluid pressure. A similar delicacy of mechanism existed in bats, to enable them to avoid small obstacles in the dark, a power which they lost when their ears were hermetically sealed.

The control of this organ on eye positions and movements was best studied in rabbits or guinea-pigs. Here it was found that every position of the head in space had a corresponding position of the eyes in the orbit, and every position of the head relative to the trunk also produced its corresponding position of the eyes in the orbit. So there was a direct control by the labyrinthine stimuli and by proprioceptive impulses from the neck muscles on the eye positions. Investigation showed that the labyrinthine impulses controlling position emanated from the maculæ of the sacculi and utriculi and that the stimuli were continuous but were varied in force inversely with the pressure of the otolith membranes on these maculæ. When the pressure was greatest the stimuli were least. The sacculus and utriculus each linked up with definite eye movements, either up and down movements or rotational movements, but not with lateral deviation movements. On the other hand, the proprioceptive impulses from the neck muscles exerted a controlling influence on all classes of eye movements including lateral deviations.

In animals with frontally placed eyes,

overlapping fields and binocular vision, the dominance of the retinal controls obscured the labyrinthine and neck muscle controls, but in decerebrate animals they were manifest and it was found that their nature was the same, though the linking up of the movements with the sacculus and utriculus respectively had undergone an alteration consequent on the alteration of the position of the eyes.

Recent researches by de Kleijn and Versteegh had rendered it very doubtful whether the separation of function in the different parts of the labyrinth was as definite as had been thought. It would almost seem as if when the sacculus was destroyed other parts of the labyrinthine apparatus acted in vicarious fashion and replaced the lost saccular function, so that, if this work was confirmed, the whole question was again pushed back into its original obscurity. It was evident that the stimuli emanating from the sacculus and utriculus depended on gravitational pressure and might be called gravitatic. The stimuli from the neck muscles varied with their condition of contraction or relaxation and might be called tonic. The stimuli from the semicircular canals initiated movements in the eyes and were themselves initiated by variations in the fluid pressure in the canals acting on the gelatinous capsules covering the cristæ ampullæ. So we might call the activity of the semicircular canals kinetic and to that extent they seemed to be in opposition to the sacculus and utriculus which sought to maintain positions of the eyes from which the activities of the semicircular canals would displace them. But the disposition of the semicircular canals on the two sides was such as to maintain a balance apart from causes which varied the fluid pressure. When this balance was disturbed nystagmus resulted. In vestibular nystagmus the sacculus and utriculus played a part, as well as the semicircular canals.

Anatomically the paths concerned in all these controls of eye movements and body equilibrium were very complex and impulses might travel to their final

common path by more than one route. Some of these paths were known but many were yet obscure. Some of them were purely vital and dyscritic; others had a gnostic element and were epicritic. But until they were more fully worked out we should not be able to solve the problem of nystagmus, nor many of the other problems involved in the interpretation of some of the more difficult forms of ocular palsies and ocular disturbances.

**Harderian gland xerophthalmia, vitamin A deficiency, keratomalacia**

MR. E. TREACHER COLLINS read a paper in which his deductions were: (1) That the eyelids and paraocular glands had been developed in animals living in an aerial environment to protect their eyes from foreign substances, and to prevent their corneal epithelium from undergoing keratinization. (2) That the lacrimal secretion acted mainly as an irrigating antibacterial fluid. (3) That the mucous secretion of the Harderian gland preserved the corneal epithelium from keratinization in those animals in which it was present. (4) That the disappearance of the Harderian gland in primates was compensated for by an increased development of unicellular mucous glands (or goblet cells) in the retrotarsal folds of the ocular conjunctiva. (5) That in animals fed on a diet deficient in vitamin A the Harderian glands soon became atrophied and ceased to function. In the absence of their secretion the epithelium of the cornea and conjunctiva underwent keratinization. (6) That this keratinization might involve the ducts of the lacrimal and meibomian glands so that they became secondarily involved. (7) That in human beings whose diet was deficient in vitamin A the mucous secreting cells of the conjunctiva atrophied and ceased to function, so that keratinization of its epithelium took place. (8) That in the absence of its mucous secretion the surface tension of the conjunctiva became altered so that the fatty secretion of the meibomian glands adhered to it. (9) That this fatty secretion formed an ex-

cellent pabulum for micro-organisms to grow in, both pathogenic and nonpathogenic; the former excited an inflammatory reaction which in the cornea resulted in keratomalacia. (10) That as the absence of vitamin A from the diet gave rise to changes in the mucous membranes of other parts of the body, similar in character to those produced in the conjunctiva, further investigation was desirable to see if they might not also be attributed to want of hydration from a deficiency of mucin. (11) That inability to see in dim light after exposure to bright light, which was a symptom frequently met with in association with xerophthalmia, had been produced in rats by a diet deficient in vitamin A and found to be accompanied by a marked delay in the regeneration of the visual purple. (Ejler Holm). (12) That xerophthalmia was frequently accompanied by pigmentation of the conjunctiva in the dark-skinned races of mankind and animals. Such hyperpigmentation in animals was due to an exaggeration of the normal pigmentation (melanin), and in this respect resembled hyperpigmentation of the skin in Addison's disease. (13) That one percent aqueous solution of mucin, suitable for application to the eye, could be prepared from the desiccated Harderian glands of sheep by the use of sodium hydroxide.

**Some cases of damage to Descemet's endothelium**

MR. FRANK JULIER read a paper on some experience of his own in support of the following dicta of Friedenwald in his recent book on the pathology of the eye: "The influence of Descemet's membrane on the nutrition of the cornea is entirely unknown, for the membrane and the lining endothelium combine to form a barrier against the passage of fluid and of substances in solution, from the anterior chamber into the cornea. When the endothelium is injured, the barrier becomes imperfect and edema of the cornea results, which manifests itself (1) in the formation of blebs under the epithelium, (2) in a general milky haze of the cornea, (3) in the

development of folds in Descemet's membrane". These experiences of Mr. Juler's could be grouped as follows: (1) edema of the cornea from a fragment of glass free in the anterior chamber, (2) corneal opacity resulting from irrigation of the anterior chamber in process of cataract extraction, (3) epithelial dystrophy of the cornea in two sisters. He related the cases in detail.

The dangers of irrigation of the anterior chamber (apart from possible infection, loss of vitreous, and the use of solutions of incorrect concentration or irritant action) would appear to lie in using the solutions too hot or under too great pressure, or in damaging the back of the cornea with the nozzle of the irrigator. The latter is an especial danger when there has been recent damage to the endothelium.

#### **The physiological action of the extrinsic ocular muscles**

MR. DUKE-ELDER outlined experimental work demonstrating the effect of choline and acetyl choline on the extrinsic muscles of the eye. The matter arose during research upon the effect of various drugs upon the intraocular circulation when peculiar reactions upon the intraocular pressure were registered with choline. These were traced to a contraction of the recti and obliques which was unaffected by atropin and which was abolished by nicotine and curare. It was pointed out this reaction corresponds in every way with the phenomena described in denervated tongue muscle by Vulpian, and innervated skeletal muscle by Sherrington, by which a pseudo-motor contraction of this order was obtained either by the stimulation of the sensory or vasodilator nerve supply or by the injection of choline. This peculiarity in the physiological action of the extrinsic muscles of the eye, whereby they behave in the same way as denervated voluntary muscle elsewhere, was discussed in relation to the peculiarities of the sensory innervation of these muscles with regard to the fifth nerve, and the sensory fibers in the third, fourth, and sixth nerve, and also with regard to

the peculiar anatomical features of the muscle fibers themselves.

#### **Night blindness due to vitamin deficiency**

DR. W. R. AYKROYD said that functional night-blindness had frequently been recorded in various parts of the world. It consisted in a temporary, often recurrent, difficulty in adaptation, and for several reasons had been thought to be due to vitamin deficiency. It was rapidly curable with cod-liver oil, or mammalian or bird livers. Though clinical evidence pointed to the lack of vitamin A as the cause of functional night-blindness, the etiology of the disease could not yet be said to be established beyond question. Vitamin A had been regarded as anti-infective, its absence predisposing to bacterial invasion of mucous membranes, but little had been made of its possible function in preserving retinal efficiency.

Last summer the writer had made observations in Newfoundland and Labrador with the view of ascertaining whether the condition was unquestionably due to vitamin A deficiency. The diets of a series of cases of hemeralopia were found to be obviously deficient in vitamin A. In some cases the disease developed in less than a month after beginning on the deficient diet. This diet contained no milk, eggs, butter, or green vegetables. One patient had learned that dark glasses protected him from the disease, so that covering one eye up by day ensured the use of one eye for night. One or two doses of cod-liver oil cured the condition in twenty-four to forty-eight hours. Exposure to strong sunlight also played a part, and this the Labrador fishermen had in plenty, as they spent a large part of each day in open boats. Still, the disease did not occur in the normal person on ordinary food, however strongly he might be exposed to sunlight. In women the disease was usually associated with pregnancy, and even when untreated tended to clear up spontaneously.

Delay in the regeneration of the visual purple, which Fredericia and Holm



demonstrated in vitamin-A-starved rats, accounted for the observed clinical facts. In the normal eye the central parts of the retina were sufficiently sensitive, when dark-adapted, to be stimulated by ordinary twilight or night illuminations. In the eye in which regeneration of visual purple was deficient or delayed, similar illuminations were too weak to stimulate the central parts of the retina, but might rise above the lower threshold of the periphery. For this form of night-blindness the term "dysskotopia" or "nutritional dysskotopia" was suggested.

#### **Oculomotor palsies from infective and toxic processes**

DR. JAMES COLLIER referred to such toxic processes as diphtheria, polyneuritis, botulism, and veronal intoxication, and the ocular paralysis occurring in myasthenia gravis, of which the pathology was not yet known. Some admirable experimental work had recently been published which had a profound bearing on this subject. He first submitted a simple division of the patterns of oculomotor paralysis as met with clinically. First there was the peripheral paralysis, which was in terms of the distribution of the peripheral oculomotor nerve or one of its branches; second, the supranuclear paralysis which was in terms of the physiological use of the eyes. In this form, diplopia did not occur, and this variety was associated with either marked widening or narrowing of the palpebral apertures, but never with complete ptosis. Third, there was the nuclear paralysis, which was characterised by its irregularity, by the affection of both eyes, by the constant loss of parallelism and diplopia, and by the presence of nystagmus. Often it seemed to be a kind of blend between a supranuclear paralysis and a peripheral nerve paralysis. Fourth, there was the paralysis resulting from the specific selective activity of a poison upon a particular physiological mechanism. Dr. Collier discussed each kind, and related illustrative cases which he had had.

#### **Transplantation of the cornea**

MR. J. W. TUDOR THOMAS gave the results to date of his efforts to carry out this proceeding. He exhibited four rabbits in which he had succeeded in producing clear corneal grafts. He said that transplantation of corneal tissue was first attempted 107 years ago, but so far no really satisfactory operative procedure had been established. His sixth method, the most successful of the methods tried, consisted of the taking of a graft from the margin of the cornea of triangular or quadrilateral shape and uniting it to the cornea by cross-stitches, a wide iridectomy being performed so as to prevent the iris from adhering to the graft. Fourteen rabbits were operated upon in this way. In thirteen of them the grafts became united. Two were quite transparent at three and four months respectively. He said that the grafts must be manipulated with great care, and must not be grasped by forceps or other instruments. Olive oil should be used to lubricate any instrument which might come in contact with the graft, and the latter should be placed in sterile olive oil before placing it in the gap prepared for its reception. The margins of the graft should be cut in a shelving manner. Partial detachment produced opacity, which usually affected the whole graft, as also did adhesion between the iris and the graft. Cross-stitching seemed to overcome most of the difficulties. He proposed to continue this work. He would not try the method on a human being until he had obtained more exact information from his experiments on rabbits.

#### **William Bowman**

SIR ARTHUR KEITH introduced his subject by relating an incident which gave an intimate view of Sir William Bowman's personality. James Syme, when regius professor of clinical surgery at Edinburgh, had in 1857 publicly condemned the operation of iridectomy for the relief of acute glaucoma, and Bowman wrote him a personal letter stating that he found it the only certain and indispensable treatment for the condition.

He did not "rush into print" though eventually Syme sent the correspondence to the *British Medical Journal*, in which his attack on the operation had appeared. Following this, Sir Arthur had much to say on the importance of personality. In his youth, Bowman made brilliant discoveries in anatomy, and in his full tide he did more than any other man in the domain of ophthalmology. Those who knew him would not ascribe his ascendancy to the iridescence which shone in life and died with the man; his was of finer and sterner stuff.

Before he was twenty-five years old, Bowman had advanced medicine by a series of notable discoveries; he had very rare gifts of mind, and he must have had some missionary quality which urged him on. It was an urgent desire for betterment which probably explained his distinction, yet only rarely could one obtain a glimpse of his motives. The master and inspirer of Bowman was Professor Robert Bentley Todd, Bowman's senior by only seven years, and with him Bowman shared the chair of anatomy and physiology. Bowman was never tired of extolling Todd's excellence in heart and life. The discovery of the improved compound microscope marked a definite epoch in anatomical and physiological discoveries, many of which the lecturer particularised. At the age of twenty-five years Bowman was elected a Fellow of the Royal Society for his paper on the structure of muscle, and in 1841 he received its Royal Medal for a paper on the structure of the kidneys. Sir Arthur considered that Bowman made a larger contribution to our knowledge of the anatomy of the eye than any other investigator; he also made important discoveries in the ear, and our conception of the basilar membrane was due to him. He made surprisingly few mistakes.

Sir Arthur touched interestingly on what he termed an enigma in Bowman's life. From his twenty-second to his twenty-sixth year investigations and discoveries followed each other regularly, and then his ardor for discovery

seemed to cool, though he still added to the resources of medicine and surgery. The last fifty years did not fulfill the promise of his earlier ones. An event of significance at this time was that in 1842 he was happily married. The lecturer speculated on what might have happened if Bowman, in the full tide of his discoveries, had been appointed surgeon to King's College Hospital in place of Sir William Fergusson.

In the course of a fascinating parallel between Lister and Bowman, Sir Arthur said that both those great men proved in their first publications that they were not apprentices but master workmen; both became Fellows of the Royal Society; they had much in common physically, and their tastes harmonized, and both had a deeply-rooted desire to help the poor and unfortunate. Also they were equally modest and unassuming. If in the turn which fate gave to Bowman's career general surgery could be said to have suffered, ophthalmic surgery certainly reaped an "exceeding rich reward".

#### Disorders of secretion of the endocrine glands associated with eye diseases

MR. J. H. FISHER said that diabetes was accepted by the specialty as the cause of a great variety of ocular manifestations: ophthalmoplegia externa and interna, toxic amblyopia, refraction abnormalities, iritis, cataract, and retinitis. Removal of the posterior lobe of the pituitary body resulted in diabetes insipidus, though it was not clear whether this diuresis might not be due to damage necessarily done to the pars tuberalis and to the floor of the third ventricle. It was relieved by injections of posterior lobe extract, and at the same time this substance had a galactagogue effect. A deficiency in the supply of insulin from the islets of Langerhans resulted in disorder of the carbohydrate metabolism of the body, so that the liver and skeletal muscles failed to store up glycogen, and an accelerated production of carbohydrates from protein—also probably from fats—took place at the same time, so that glucose appeared in the urine. Proper

doses of insulin would restore the balance, while an overdose caused hypoglycemia.

An excess of the thyroid hormone stimulated adrenal function, but the immediate effect of thyroxin was to diminish the animal's sugar tolerance. Atrophy or excision of the thyroid gland, or of the anterior lobe of the pituitary, increased the sugar tolerance of the body. Mr. Fisher wondered whether, in mild cases, the ophthalmic surgeon had a conception of the perverted processes which were responsible for the appearance of the detected glucose. He needed to know more about the case: whether, for instance, it was a case of pancreatic incompetence—possibly from malignant disease—with a hyperglycemia. If no glucose were found in the urine, then possibly an atrophy of the thyroid gland or a diminished secretion from the anterior lobe of the pituitary, by increasing the sugar tolerance, was disguising the case. He asked for the assistance of physicians and biochemists in this discussion.

It would be wise to seek a physician's advice as to the best moment for performing a cataract extraction on a glycosuric patient. Dr. Cammidge's showing that retinal hemorrhages were due to a low calcium content in the blood was very valuable, as calcium lactate administration was obviously the treatment. Myasthenia gravis had been described as associated with hyperplasia of the thymus, congestive enlargement of the parathyroids, and with exophthalmic goiter. Thyroid extract had been used in its treatment. He also referred to cases of myotonia atrophica with familial cataract, for which a metabolic disturbance had been suggested. There were also cases of pigmentary degeneration of the retina associated with polydactylism, which had been associated with hypopituitarism. Fields of vision similar to the pregnancy fields

could be demonstrated in women who had undergone double oophorectomy. The hyperthyroidism of Graves' disease was commonly accompanied by amenorrhea.

The endocrine glands, he said, were factories, each turning out its special product which was essential not only to health but to life, and the perpetuation of the species. Raw material reaches each of the factories by way of the blood stream. He suggested that in cases of endocrine disorder the biochemists should investigate to the utmost the constitution of the blood, from which alone the ductless glands drew their pabulum and into which they poured their products; it might well be that in this direction would be found the solution of many of the most fascinating problems.

*Discussion.* PROF. H. MACLEAN dealt with the subject from the medical side, practically confining his remarks to glycosuria. It was in the type of case in which glycosuria was associated with difficulty of liver storage that the majority of retinal lesions occurred. Sometimes the eyes were affected when the patient appeared to be in perfect health, and it was then difficult to get consent for insulin treatment merely on the basis of slight retinal difficulty. Since the introduction of insulin treatment, there was no more risk in operating on a diabetic patient than if there were no glycosuria present.

Professor Dodds found the standard textbooks difficult to understand on the question of cataract, as many statements were made in this connection which could not be followed by the biochemist. He made a suggestion, which if followed might clear up many doubts, namely, that a biochemist should be included on the staff of each ophthalmic hospital.

(Reported by H. Dickinson)

# AMERICAN JOURNAL OF OPHTHALMOLOGY

PUBLISHED MONTHLY BY THE OPHTHALMIC PUBLISHING COMPANY

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## AXENFELD

It would be difficult to mention a man whose name and personality have meant more for the development of the periodical literature of ophthalmology than Theodor Axenfeld, professor at Freiburg, and editor for thirty years of the *Klinische Monatsblätter für Augenheilkunde*. His death on July twenty-ninth of this year, at the relatively early age of sixty-two years, will naturally be most of all a matter for regret among those German, Austrian, and Swiss colleagues with whom he had cooperated for so many years; but it must also awaken a feeling of something akin to personal bereavement among readers of German ophthalmological literature the world over, for in the breadth and quality of its usefulness the *Klinische Monatsblätter für Augenheilkunde* may justly be acknowledged as leader among eye journals.

In the bitterness of the world war,

some unkind things were said by ophthalmologists in enemy countries with regard to German science and German physicians. When criticisms such as these were uttered by Axenfeld's former ophthalmological colleagues, he felt them keenly, and he did not hesitate to express his resentment in private communications; but in his journal he made no reply, "because", as he said in 1926, "we wished to keep our publication free from such things, and because we believe that such attacks right themselves and in the end are sources of permanent embarrassment only to their authors".

In spite of the tremendous difficulties created by the war, Axenfeld enjoyed the complete cooperation of his publisher, the firm of Ferdinand Enke of Stuttgart, in maintaining the quality of the *Monatsblätter*, although its list of subscribers became smaller than it had been since Axenfeld, in the winter of 1899, had first joined the editorial staff, as assistant to Zehender. "In Europe



the 'Klinische Monatsblätter' was the only remaining place where during the war, from 1914 to 1919, the literature of the world was abstracted, even from enemy countries"; this being rendered possible by friends in Holland, Switzerland, and Scandinavian countries.

In the January, 1926, issue of the *Klinische Monatsblätter für Augenheilkunde*, the publisher paid Axenfeld the compliment of reproducing, as an excellent photogravure frontispiece, the



Theodor Axenfeld

portrait which is reproduced on this page, and Axenfeld himself was persuaded to give a delightful account of "Twenty-five years of editorship of the *Klinische Monatsblätter für Augenheilkunde*". Zehender's invitation to the young professor, in 1899, was promptly accepted "as a duty, as an act of piety". Zehender, who was then over eighty years old, announced this event in the following humorous phraseology: "The greatest contrasts—the youngest and the oldest among ophthalmologists, the 'A' and the 'Z'—will by their union, it is to be hoped, insure to best advantage the further prosperity of the journal!"

Zehender, who had arbitrarily kept the activities of the *Monatsblätter* with-

in narrow limits, resigned six months later. Axenfeld, having accepted the editorship, steadily broadened the scope of his journal to include reports of ophthalmological meetings and a comprehensive abstract department.

Writing at the end of his twenty-fifth year of editorship, Axenfeld stated that during the quarter century three thousand manuscripts of original articles had passed through his hands (excluding reports of society proceedings and all other miscellaneous material). He spoke enthusiastically and gratefully, as medical editors may well do, of the faithful services of many collaborators throughout the years. Tactfully, reference was made to the fact that from time to time the practice of this or that collaborator had increased to such a point as to render work on the *Monatsblätter* burdensome, so that it became necessary for some younger man to step into his place.

Axenfeld's account of his personal labors might well serve as a guide to other workers in the field of medical journalism. He did not agree with the dictum of a famous German pathologist and editor, who, when asked why he published without change so many articles of trifling value and excessive length, answered: "No one ought to be prevented from making himself ridiculous." Axenfeld did not hesitate to offer suggestions as to arrangement, as to earlier references in the literature which had been overlooked by the author, as to condensation, or as to elimination of unpleasantly controversial statements. In other words, he kept steadily in mind the interest of both reader and author.

He had a word for the reader who can not tolerate in a journal what may interest others but does not interest himself. "This material", he urged, "may be welcome to other readers, and moreover the possibility should be afforded to occupy oneself and instruct oneself in such questions. It does no harm if here and there more difficult things make us conscious of the limits of our own knowledge and stir us to widen the field."

Axenfeld found time for other activities. His professorship in the Freiburg clinic served as the basis for a number of important papers on ophthalmology. His textbook (written in collaboration with Bach, Bielschowsky, Elschmig, Greeff, Heine, Hertel, Hippel, Krückmann, Oeller, Peters, and Stock, is of the very best. He was well known as a clinician. Small in body and stature, living in a city of less than 100,000 people, his influence upon ophthalmological thought and progress was probably not exceeded by that of any of his contemporaries. *W. H. Crisp.*

### BIASTIGMATISM BOBS UP AGAIN

At the International Medical Congress in London in August, 1913, Marquez of Madrid presented a paper entitled "Diagnosis of biastigmatism and its treatment with bicylindrical glasses with oblique axes".

In that paper Marquez was reported as saying in part: "There are cases in which the principal meridians of the corneal astigmatism and of the remaining astigmatism are so placed that they form an acute or obtuse angle with one another. This is biastigmatism. (Theoretically there is also a triastigmatism, if the principal meridians of the cornea, of the lens, and of the fundus do not correspond.)"

Four years earlier, before the International Congress of Ophthalmology in Naples, Marquez had reported what he chose to call the "first case of biastigmatism".

The arguments presented by Marquez were based upon the well known fact that, while astigmatism may exist both in the cornea and in the crystalline lens, the axes of these two astigmatic elements do not commonly correspond with one another, nor are they usually exactly opposite to one another. Both the axis and the amount of the corneal astigmatism may be determined with the ophthalmometer, but there is no such possibility of instrumental measurements as regards the lenticular astigmatism.

Marquez advised first correcting the corneal astigmatism as found with the ophthalmometer, and then testing the subjective astigmatism by means of an astigmatic chart. The amount thus found was spoken of as "remaining astigmatism" (the "supplemental astigmatism" of Tscherning).

At this point Marquez's technique closely resembled that ordinarily employed by other workers. But the eccentric feature of his method consisted in writing into the patient's prescription the cylinder and axis as shown by the ophthalmometer, and a second cylinder and axis corresponding to the difference between the "remaining astigmatism" and that found with the ophthalmometer.

The heresy thus propounded received short shrift at the International Medical Congress of 1913. Stock of Jena, a master of optical theory, said in discussion: "It is an absolute error that with two crossed cylinders more is to be accomplished than with one simple astigmatic glass. An astigmatic optical system can have any sort of composition, of any given number of cylindrical systems, with the most varied cylinder axes, yet an astigmatic bundle will always result on the visual side (Bildseite) having two focal lines in two symmetrical planes standing at right angles to one another. If an eye is examined for corneal astigmatism, it may happen that through the corresponding correcting glass there is still a remainder of astigmatism, originating in the lens system of the eye. Naturally the cylindrical effect of the crystalline lens may be arranged otherwise than that of the corneal system. It would then be necessary to add to the correcting glass which compensates for the astigmatism of the corneal system a second cylindrical glass with such and such an axis for compensation of the lenticular astigmatism. The effect of the two cylindrical glasses can, however, be replaced just as well with a single glass having a cylindrical effect. Naturally the focal strength and the position of the axis must be suitably selected."

Since the London meeting in 1913 not much has been heard of biastigmatism. In 1921 Marquez published a paper in which he discussed the frequency of biastigmatism and its principal varieties. Recently (*Archivos de Oftalmologia Hispano-Americanos*, 1930, volume 30, page 169) he has reiterated his earlier arguments.

In his reply to Stock's criticism at the International Medical Congress of 1913, and elsewhere, Marquez has elaborated the following peculiar line of reasoning. First assuming that the corneal astigmatism and the lenticular astigmatism can each be represented by the usual exact fractions of dioptric measurement, such as 0.50, 0.75, 1.25 diopter, he admits that the combination of two astigmatisms pertaining to the cornea and crystalline lens respectively can be expressed in a spherocylindrical formula, but he points out that the new formula will express both sphere and cylinder in unusual and inconvenient fractions, such as 0.17, 0.32 diopter.

"That is to say", he argues, "although theoretically the bicylindric combination is equivalent to a spherocylinder, in practice the first will at times be preferable. . . . On the other hand, the spherocylindric combination will be preferable when it contains a cylindric component which differs by very few hundredths from the lenses in current use."

But these contentions are based upon the extraordinary assumption that the natural fractions of ocular refraction are commonly exact fractions of the metric system as encountered in the trial case. As a matter of fact, the natural fraction of either corneal or lenticular astigmatism has as much chance of corresponding to the exact fraction of the artificial dioptric system as of lying at any point whatever between these fractions; and no more chance of the one than of the other. Thus, when we prescribe a 1.25 diopter cylinder, even if there is no lenticular astigmatism, the astigmatic defect of the patient's cornea may lie practically at any point of the decimal system between 1.25 and 1.37, although

presumably nearer to the former than to the latter.

Starting, therefore, with a combination of lenticular astigmatism whose natural fraction would actually be represented by an intermediate decimal figure, and a corneal astigmatism whose decimal statement would also be intermediate and not according to the trial case fraction, it is perfectly logical to measure, as practically all refractionists do measure, the net resultant of corneal in combination with lenticular astigmatism, and to express this resultant in the nearest arbitrary fraction of the diopter, that is at the nearest quarter or eighth diopter, according to the preference of the individual ophthalmic physician.

It is the common opinion of scientific optical students and practitioners that there is absolutely no logical basis for the complicated and impracticable type of prescription for astigmatism employed by Marquez. The only useful purpose of calling attention to the matter on this occasion is to render it less likely that those of more limited optical training will be misled by arguments such as have been put forward by the eminent Madrid ophthalmologist.

*W. H. Crisp.*

#### ON EDITING OUR OWN MANUSCRIPTS

The medical man who writes an address, a broad study of some complex medical problem, an account of a new method of treatment, a discussion of a research investigation into which he has delved, a description of a new instrument, or a brief case report assumes that he has a message to convey to his colleagues; and, while we cannot all possess anything like genius in the art of self-expression, he should tell that message to the best of his ability.

Granted that the message is a proper one to bring before a seen or unseen audience, as an address or lecture or original article, or even as an abstract of another man's work, the most important need is that it shall be clearly understood. From the perfect description of a new surgical operation, it

should be possible for the reader, if otherwise fitted therefor by previous training, to repeat the operation without seeing it executed by another surgeon. But careless use of the words in a single sentence, an inadequate conception of what ideas will be awakened in the mind of the reader by the language employed, may render the account incomplete or misleading.

Another quality most advisable in medical as in all other literature is that the thing to be said shall be delivered with due regard to economy of the reader's time and power of persistent attention; that the reader shall not be wearied by a length of statement unnecessary for conveying an adequate message. Brevity is the soul of wit. It is possible to be too brief, and there are even noted eye surgeons whose brevity is excessive, in that they do not tell enough of the story. But it is advisable to attempt some self-criticism as to whether the reader may be expected to make use of this or that elaborate table, or is likely to wade through an excessively laborious review of the previous literature, or to struggle through a score or two of case records whose gist could be better told in a few carefully considered paragraphs.

Elegance is not to be forgotten. Medical men are not always fastidious as to English construction or literary form, and there are some who do not bother their heads about fine points of grammar or even of spelling in their medical journals. But it is to be considered that among the readers who are worth while there are many who have a not inconsiderable regard for these secondary matters of literature; and it is undesirable to present one's statements in such slovenly form that even the moderately fastidious will become constantly or repeatedly offended by lapses from educational polish and good taste.

Last, but perhaps not least, do not forget the long suffering editor and printer. The latter can hardly be blamed for making more mistakes in setting up a badly typewritten manuscript; while the former, if he dislikes

to present his author in an unfavorable light, and yet does not care to reject what there is of good in a manuscript, may have to labor half a day over changes of a paltry character, or even in partial reconstruction of phraseology and arrangement.

Too many of us never read what we write, not even the letters we have dictated for sending to our colleagues. Many of the manuscripts submitted for publication in this and other medical journals have manifestly not been read over by their authors after being transcribed on the typewriter. Relatively few manuscripts give evidence of having been read carefully and critically, with a keen eye to the correction of minor errors, to the rearrangement of what was not satisfactorily said or planned upon the first impulse, or to the omission of what is redundant or superfluous.

It has been said that few subscribers to medical journals are regular readers of these publications, and it is possible that the majority of the subscribers to the American Journal of Ophthalmology will fail to read this editorial. But many authors would suffer qualms of conscience, at least, if they could only realize how many trifling but tiresome changes, to say nothing of more important corrections, are necessary before their manuscripts are sent to the printer.

The world does not contain many writers, medical or otherwise, who at the first attempt can put into perfect form what they wish to say, without need of change and reconstruction. Every manuscript submitted to a journal for publication should, as regards mechanical form, spelling, correct use of language, and effectiveness of arrangement, be put into the most perfect condition of which the author is capable before it is started on its way to the editorial office. The discipline of such effort is just as valuable to the author himself as is labor expended in applying the finishing touches to any other sort of craftsmanship.

*W. H. Crisp.*



## BOOK NOTICES

**A redetermination of the trichromatic mixture data.** (Number 7 of the reports of the committee upon physiology of vision, Medical Research Council of Great Britain.) By W. D. Wright. Pamphlet, paper covers, 38 pages, numerous figures and graphs. London, His Majesty's Stationery Office, 1929. Price 1s. 3d. net.

In this research, the problem of trichromatic mixtures has been approached by methods considerably different from those used by older outstanding workers. A new form of colorimetry apparatus was designed to eliminate many of the defects of earlier devices for measuring color. The Young-Helmholtz three-sensation theory, whether entirely or mainly correct, or quite false, is accepted on the ground that it provides a good foundation on which to base a relatively simple mental picture of the phenomena. But the author breaks away from the use of fundamental luminosity units, employing a new system of coordinates in which the amounts of the three primaries in the white match are equal. Equations were obtained by which the two variables, luminosity and color, are separately dealt with, and by which a simpler two-coordinate system can be used in place of the old equilateral color triangle.

The apparatus, besides mixing the various monochromatic pencils, also acted as a filter to purify each individual beam. A more satisfactory control of intensity was obtained by means of calibrated wedges instead of the slit-width or some polarization method. The almost complete freedom from

stray light was another most important feature. A field of two degrees insured the limitation of the image entirely within the yellow spot.

The results of thirty-six observers lead to the conclusion that the major source of variations in the white points among normal trichromats is due to the macular pigment varying greatly in density and to a less extent in dominant hue. These variations are surprisingly big, and most seriously affect any system of color measurement which does not make allowance for them.

This paper is an admirable piece of scientific work. It clearly shows that, until data for a normal eye have become standardized, the scope of colorimetric science will be strictly limited. This applies to all forms of colorimetry and not merely to the trichromatic system. More research is urgently needed for practical colorimetry. According to Wright, a filter is wanted by which pigment variations can be eliminated; when obtained, the residual amounts by which color coefficients determined by different observers still vary will have to be investigated. Moreover, determinations of sensitivity must be made for saturation, when the hue remains constant; and for hue, with given degrees of saturation. Further work in connection with extrafoveal observations and the effects of an illuminated "surround" may yield interesting results. Judging from the results of this investigation, any modifying influences found to be due to the complexity of the physiological mechanism involved in colorimetry will probably be of a small order and unlikely to affect the value of practical colorimetry.

*George H. Stine.*

# ABSTRACT DEPARTMENT

Abstracts are classified under the divisions listed below, which broadly correspond to those formerly used in the Ophthalmic Year Book. It must be remembered that any given paper may belong to several divisions of ophthalmology, although here it is only mentioned in one. Not all of the headings will necessarily be found in any one issue of the Journal.

## CLASSIFICATION

- |  |   |
|--|---|
| 1. General methods of diagnosis                        | 9. Crystalline lens                           |
| 2. Therapeutics and operations                         | 10. Retina and vitreous                       |
| 3. Physiologic optics, refraction, and color vision    | 11. Optic nerve and toxic amblyopias          |
| 4. Ocular movements                                    | 12. Visual tracts and centers                 |
| 5. Conjunctiva   | 13. Eyeball and orbit                         |
| 6. Cornea and sclera                                   | 14. Eyelids and lacrimal apparatus            |
| 7. Uveal tract, sympathetic disease, and aqueous humor | 15. Tumors                                    |
| 8. Glaucoma and ocular tension                         | 16. Injuries                                  |
|  | 17. Systemic diseases and parasites           |
|  | 18. Hygiene, sociology, education and history |

### 3. PHYSIOLOGIC OPTICS, REFRACTION, AND COLOR VISION

Sattler, C. H. **Prisms in spectacles in the early treatment of concomitant strabismus.** Klin. m. f. Augenh., 1930, v. 84, June, p. 813.

It is of paramount importance to keep the fusion faculty intact. The author combines prisms as high as twenty degrees in each eye with the correction for the refractive error in order to develop, and prevent loss of, the power of binocular single vision. He determines what strength of prism is necessary by the screen test. The results are controlled functionally. He tests for retinal correspondence with the methods of Tschermak and Bielschowsky, and for degree of depth perception with Hering's test or his own stereoscopic pictures. Finally Sattler measures the fusion range by testing from time to time what strength of adducting and abducting prisms can be overcome while holding binocular fixation.

The author has used it in over two hundred patients and advocates its very early use. In one hundred and thirty-five patients which have been under observation long enough, fifty-seven attained good depth perception. Even in some instances where the after-image test demonstrated false localization the defect was corrected. In many the fusion range was greatly increased.

The longer strabismus has existed

the more difficult it is to establish depth perception. The average length of time during which strabismus had existed in the fifty-seven patients in which depth perception was reestablished was one-third of their lives; in the fifty-six unsuccessful instances, four-fifths of their lives. This emphasizes the necessity for the early use of prism spectacles. In some instances the fusion range is so greatly increased that the patient is enabled to learn to fuse normally after he removes his prisms. When the angle of deviation is so great that prisms cannot bring about binocular fixation, he operates, even before the patient is two years old.

*F. H. Haessler.*

Silvestrina, F. **An analytic study of the adaptability of the human pupil to varying intensities of light.** Ann. di Ottal., 1930, v. 58, March, p. 255.

In his work on photometry, Lambert gives the result of many experiments in which the size of the pupil in millimeters is studied in relation to the light intensity. He arbitrarily places the maximum intensity of illumination at 100 with a gradual and proportional reduction. The diameter of the pupil is taken from 2.55 mm. to 7 mm. Repeated experiments demonstrated that the increased increment in the pupillary size was fairly constant. This led Ovio to formulate the law that the product of the coefficient of the pupillary dilata-

tion multiplied by half the value of the light intensity is a constant of about 54. This is a notable achievement in itself, but the author, who is an engineer, does not consider it mathematically exact, because the table was calculated with vision at infinity. If varying distances were taken the curve would become hyperbolic and variations though slight would be present. The problem is one which he passes to specialists in physiological optics.

*Park Lewis.*

Waardenburg, P. J. **Anisometropia and corneal refraction.** *Klin. M. f. Augenh.*, 1930, v. 84, June, p. 788.

In this essay the author does not propose to throw light on the anisometropia question, for he has done that elsewhere. He wishes to investigate whether spherical corneal refraction is dependent on total refraction and to what degree. For this problem anisometropic material is of great importance since it represents a bilateral asymmetry in the same person. One may assume that there are no separate hereditary dispositions for the two halves of the body. It is, therefore, interesting to note whether, with the same disposition of corneal refraction for both body halves, this disposition is modifiable under the influence of total refractive asymmetry, or whether, corneal refractive asymmetry is a constant constituent of total anisometropia. Out of one hundred pairs of eyes there was no difference whatever in seventy-five, in twenty the difference was not more than one-half diopter, and the greatest difference was 1.4 diopter. The material allows one to conclude that corneal refraction is independent of axial length, of total refraction, and of the tendency to progression in myopia. Where myopic eyes tend toward inverse astigmatism the change depends on a decrease of the curvature of the vertical meridian, rather than on an increase of that of the horizontal. The same total refraction can be combined with many different corneal refractions, and the converse is also true.

*F. H. Haessler.*

Waardenburg, P. J. **Variability of corneal refraction.** *Klin. M. f. Augenh.*, 1930, v. 84, June, p. 795.

In an earlier essay the author concluded that the normal spherical corneal refraction, as well as the index between the main axes, were hereditary characteristics with great stability of manifestation. Corneal refraction is independent of total refraction. This is best shown in anisometropia. The well known curve of variation of corneal refraction is a population curve of probably four or five biotypes. This does not mean that the cornea does not change from the time of its formation until death, but that the final form is hereditarily predetermined and only small variations are possible. In astigmatism an average corneal refraction is retained in which one media is increased and the other decreased.

In order to advance further proof for this assumed manifestation of stability of corneal refraction, the author collected data on eyes with bilateral and unilateral developmental malformations. The latter were the more interesting. These eyes had microphthalmos, microcornea, aniridia, uveal coloboma and ectopia of pupil and lens. All these investigations led to the same result. Even abnormal conditions such as changes in the form of the periphery of the cornea cannot modify its central refractive state. Development may be arrested so that the corneal refraction which was predetermined by the person's hereditary structure is never reached. Only very gross malformations (tumors, early rise in intraocular pressure) can change the cornea. Otherwise the normal spherical corneal refraction has great stability of manifestation and is modifiable only within the narrowest of limits.

*F. H. Haessler.*

#### 4. OCULAR MOVEMENTS

Curtis, F., and de Decker, J. F. **Hereditary disposition in recurrent oculomotor paresis.** *Klin. M. f. Augenh.*, 1930, v. 84, June, p. 773.

The cause and nature of this disease are still in doubt. It has been associ-

ated with migraine by some authors. Of one hundred cases reported, only three have come to autopsy and in each instance a tumor of the third nerve was found. In all these the paralysis had become permanent. In the authors' patient it was impossible to find the cause, but some of the findings suggested that the condition was hereditary. Curtis and de Decker, therefore, studied the entire family and were able to examine forty-three of the sixty-five members for four generations. Of these, sixteen individuals were afflicted with some neurologic-psychiatric aberration. There were ten cases of anisocoria. Such a large number of neuropathic individuals points to a hereditary inferiority of the central nervous system. What type of heredity is followed cannot be stated with certainty until other families are studied. It is probable, however, that recurrent oculomotor paralysis is not inherited in a simple manner, but results from the synergy of several genes. This is supported by the great rarity with which two individuals are attacked in the same family, and by the familial polymorphism. *F. H. Haessler.*

Hemmes, G. D. **The analysis of ocular movement in latent nystagmus.** Arch. f. Augenh., 1930, v. 103, June, pp. 246-262.

Latent nystagmus manifests itself in that when one eye is covered and the other fixes a point 1 meter distant, the open eye quickly deviates to the temporal side and slowly returns to the primary position. The ocular movements about the vertical axis are about 5.5.

The author discusses the various theories of latent nystagmus.

*Frederick C. Cordes.*

Ohm, J. **Nystagmus of albinos.** Arch. f. Augenh., 1930, v. 103, June, pp. 216-234.

The nystagmus of albinos is characterized by the uniformity of direction, frequency and amplitude of swing under all conditions. This differentiates

it from vestibular and central nystagmus. The same signs are also found in other types of congenital amblyopic nystagmus. The various possible theories as to its cause are also discussed. *Frederick C. Cordes.*

Selinger, Elias. **Cyclic or rhythmic oculomotor paralysis.** Arch. of Ophth., 1930, v. 4, no. 1, July, p. 32.

Twenty-eight cases of this peculiar condition had been previously reported in the literature. The condition is characterized by two stages. In the author's case, in the first or flaccid stage, there was drooping of the upper lid, outward deviation of from forty to forty-five degrees, and dilatation of the pupil. After twenty seconds the second or spastic stage set in. Here the outer portion of the eyebrow moved upward, the upper lid elevated in a jerky manner, the squint angle diminished from five to eight degrees, and the pupil contracted rapidly. This stage continued for fifteen or twenty seconds, and was again followed by the flaccid stage. Voluntary efforts had little influence. There was good abduction, but poor adduction. The pupil contracted under pilocarpin, the contraction apparently producing pain during the spastic cycle. Homatropin dilated the pupil and abolished the pain. The fields for form and color were normal and there were no central scotomas.

The author reviews the literature and discusses the etiology, which is still very much in doubt. It is probable that congenital syphilis is partly responsible for the condition. *M. H. Post.*

Verrijp, C. D. **Ocular movements.** Arch. of Ophth., 1930, v. 4, July, p. 73.

This paper is a technical study of the kinematics of the eye. Verrijp claims that the center of rotation of the eye is not in a definite position, and that this fact should be taken into consideration in taking x-ray pictures from different angles in locating foreign bodies. He believes that this lack of a definite center of rotation explains



the difficulty that some people have with glasses. *Ralph W. Danielson.*

disease. One should be encouraged to continue and extend the fight.

*F. H. Haessler.*

##### 5. CONJUNCTIVA

Alissow, P. A. and Lipowitz. **N. S. An attempted specific trachoma therapy.** *Klin. M. f. Augenh.*, 1930, v. 84, June, p. 832.

The author prepared a vaccine by grinding expressed or excised conjunctival trachoma granules with sand and saline solution and filtering through paper. To increase the effect of the specific elements by a simultaneous nonspecific protein therapy they added three parts of inactivated horse serum. The mixture was sterilized at 56° C. for forty-five minutes. The effect of the preparation was noted on nineteen patients. The authors have the impression that the fresh granular stage of trachoma healed more rapidly than it does with symptomatic treatment. The dry papillary form seemed less amenable to specific therapy. Pannus gradually improved and inflammatory manifestations rapidly diminished. Though their material is inadequate for sweeping generalizations, the authors feel greatly encouraged.

*F. H. Haessler.*

Amirli, A. C. **Pigmentation of the conjunctiva in morbus Addisoni.** *Zeit. f. Augenh.*, 1930, v. 71, June, p. 254.

Brown areas were noted in the conjunctiva of a thirty-two-year-old Turk afflicted with Addison's disease. In a histological preparation from a piece of conjunctiva excised during life it was found that the cells of the basal layer of the epithelium were almost invisible, because they were so greatly filled with melanin.

*F. H. Haessler.*

Birch-Hirschfeld, A. **Some remarks on trachoma eradication.** *Zeit. f. Augenh.*, 1930, v. 71, June, p. 213.

In countries in which efforts have been made to eradicate trachoma there certainly has been a regression of the

Carrère, L. **Cysts of the conjunctiva.** *Bull. Soc. Franç. d'Ophth.*, 1929, p. 249.

Carrère reports an epithelial cyst developed in the submucous tissue of the conjunctiva of the upper cul-de-sac. In discussing the origin of the cyst, the author concludes that it arose from the canal of a gland of Krause and he presents histologic evidence in support of his view. He concludes that the majority of conjunctival cysts, including those usually classified as of embryonic origin, are in reality retention cysts developing in an excretory canaliculus and separating from the glandular part in course of their evolution.

*Phillips Thygeson.*

Kunz, Eberhard. **Frequency of trachoma in East Prussia in the last year based on the experience of the Königsberg clinic.** *Zeit. f. Augenh.*, 1930, v. 71, June, p. 217.

A statistical study shows that trachoma is by no means a disease which is approaching extinction. It is still widespread, with no tendency to diminish. Redoubled efforts to fight the disease seem urgently indicated.

*F. H. Haessler.*

Muende, I. **Conjunctivitis as a trichophytide manifestation.** *Brit. Jour. Derm. and Syph.*, 1930, v. 42, Jan., p. 26.

The author cites a case of trichophytide infection of the scalp in which the patient also developed a severe conjunctivitis. He considers this conjunctivitis as due to an allergic phenomenon, associated with the trichophytide infection, just as an allergic lesion develops in a tuberculous individual.

*M. E. Marcove.*

Redslob, E. **On the retraction of the conjunctiva.** *Bull. Soc. Franç. d'Ophth.*, 1929, p. 255.

Redslob describes the case of a young man having bullous lesions in-

volving various parts of the body including the conjunctiva, recurring over a period of sixteen years. Extensive retractions of the conjunctiva occurred but the corneae remained clear. The general health was unaffected. The author believes that this disease can be classified under the polymorphous dermatitis of Duehring-Brocq, and that it can be definitely distinguished from true pemphigus because of failure to involve the health or vision of the subject. He concludes that essential retraction of the conjunctiva is not always due to pemphigus and that the disease of Duehring-Brocq can be one of the causes.

*Phillips Thygeson.*

Renard, G. **Vaccinotherapy of gonorrheal conjunctivitis.** Bull. Soc. Franç. d'Ophth., 1929, p. 242.

Since 1925, Renard has treated all cases of gonorrheal ophthalmia, both in the infant and in the adult, with subcutaneous injections of vaccine. The vaccine is concentrated; is killed by heat; and, in addition to gonococci, contains pneumococci, streptococci, staphylococci, pseudodiphtheria bacilli and *B. pyocyaneus*. The dosage is such that a mild febrile reaction is produced, and the vaccine is repeated at twenty-four to forty-eight hour intervals until the disease is under control. In a series of twenty-three newborn treated in this manner, twenty showed complete healing without complication. The use of the vaccine is contraindicated in tuberculous subjects, as activation of the pulmonary lesions can occur.

*Phillips Thygeson.*

Terson, A. **Adenoid and appendicular states in folliculo-adenoid conjunctivitis of adolescents.** Ann. d'Ocul., 1930, v. 167, June, pp. 527-532.

The author believes that follicular conjunctivitis in children is part of a general syndrome, with associated enlargements of tonsils and other adenoid tissue; it is occasionally found associated with appendicitis. Unless this is thoroughly appreciated and these asso-

ciated pathological conditions are also treated the patient has not received proper consideration.

*Lawrence T. Post.*

## 6. CORNEA AND SCLERA

Ebaugh, G. F., and Jefferson, R. A. **Herpes ophthalmicus febrilis with dendritic keratitis complicating therapeutic malaria.** Arch. of Neur. and Psych., 1929, v. 22, p. 1226.

The authors present a case of herpes febrilis with dendritic keratitis complicating malarial therapy for cerebrospinal lues. They were unable to find any other reports in the literature of a similar case occurring after inoculation with therapeutic malaria. They believe that this complication is an indication for an immediate termination of the malaria, as it may result in a permanent visual defect, and relapses may occur following postmalarial arsenical therapy.

*M. E. Marcove.*

Katz, Dewey. **Salzmann's nodular corneal dystrophy.** Arch. of Ophth., 1930, v. 4, July, pp. 16-21.

Nodular corneal dystrophy was first described by Groenouw in 1898. Marked elevation of the pathological areas is characteristic of the lesion described by Groenouw, and is absent in those described by Salzmann. These prominences are usually round or prismatic and often wedge-like. They vary in number from one to eight, and are bluish-white in color. Twenty-three cases are reported by Salzmann in which elevation did not occur. It is most frequently seen between fifteen and thirty years of age, and again between forty-five and fifty-five. Eczematous pannus is almost always present, the lesion occurring at the margin of such pannus, excepting where it covers the entire cornea. In eighteen cases it occurred in one eye only. It is distinctly a dystrophy of the cornea. Treatment unavailing.

The author reports one such case. Undoubtedly, the condition is far more common than these reports would indicate.

*M. H. Post.*

Levkoeva, E. F. **Corneal degeneration with deposits of uric acid crystals.** *Russkii Opht. Jour.*, 1930, May, pp. 631-634.

In a patient, forty-eight years of age, the left cornea was very small (microcornea) and totally opaque. Its lower third was occupied by scintillating, whitish deposits. On microchemical examination the latter were found to consist of crystals of sodium urate and of free uric acid. *M. Biegelman.*

Ling, W. P. **The measurement of the limbus in Chinese eyes.** *Arch. of Ophth.*, 1930, v. 4, no. 1, July, pp. 22-31.

The author finds that, compared with the measurements of Le Magourou, the limbus in Chinese eyes is wider than that in European eyes. This is especially true in the vertical meridian. It is of particular importance in surgery. Age and sex have no bearing on the measurement. It varies greatly in different individuals. It is widest of all above, and wider below than on the sides.

Interesting details of how the measurements were made accompany the paper. *M. H. Post.*

Mann, Ida. **A rare congenital abnormality of the eye.** *Brit. Jour. Ophth.*, 1930, v. 14, July, p. 321.

This investigator refers to Star-gardt's division into four groups of congenital anomalies of the cornea of a fibrolipomatous nature. All types of so-called congenital dermoid of the cornea can be referred to abnormal development of the mesoblast lying between the anterior rim of the optic cup and the surface ectoderm. The first and rarest group of these malformations has its growth immediately before the formation of the lens; the cases of the second group arise during the process of formation of the lens; the third group after the formation of the lens; the fourth group contains limbal dermoids.

The case here reported and examined makes the fourth example recorded of fibrolipomatous anomalies of the cornea. The growth was obtained from

a female Hindu aged four months. The mass occupied the left orbit and was two inches in diameter with a pedicle three-fourths inches in diameter. The anterior portion was covered with skin. Sections just beneath the skin showed a layer of fibrous tissue containing blood vessels and sweat glands. The body of the growth contained fibrofatty tissue, one or the other predominating, depending upon position. The fibrous tissue showed myxomatous degeneration in certain areas. (Seven photomicrographs and two illustrations). *D. F. Harbridge.*

May, George A. **Herpetic keratitis.** *Jour. Iowa State Med. Soc.*, 1930, v. 20, no. 1, Jan., p. 16.

The author summarizes the earlier work on this condition and concludes that the infectious nature of herpes is definitely established. He believes that herpes is a disease with definite specific tissue changes, and is no longer to be considered merely as a symptom of systemic disease.

The etiological agent is a filterable virus found on the skin and mucous membrane, existing in a saprophytic form, but, with lowered resistance of the body, becoming locally active in the nerve structures.

The pathological changes found in the lesions are the presence of intranuclear inclusions in the epithelial cells and other cells of the affected areas. These inclusions are granular, and are surrounded by a fatty capsule with a transparent zone; they take a basic stain, and occupy almost the entire nucleus.

Goodpasture considers the specific histological changes as evidence of the relationship of herpes simplex, herpes zoster and chicken pox, and believes that these changes are not found in any other known human diseases. The classes of herpetic keratitis are dendritic, vesicular, filamentous, superficial punctate, disciform, profunda, and the corneal lesions of herpes zoster. In all of these the herpes virus and the typical nuclear inclusions have been demonstrated.

The treatment of the corneal, as well as the other manifestations of herpes, is nonspecific, since it is now recognized that we are dealing with an infection with local manifestations in the presence of general lowered resistance.

*M. E. Marcove.*

Medvediev, N. I. **Autohemotherapy in the treatment of trachomatous pannus.** *Ukrainskii Oft. Jour.*, v. 1, pt. 2, pp. 67-71.

Inasmuch as autohemotherapy is rapidly becoming a universal method of treatment in medicine in general and in ophthalmology in particular, the author considered autohemotherapy of sufficient merit to be tried in cases of trachomatous pannus. Although this method has been used for years, yet to date this problem has not been satisfactorily explained in the literature. Therefore, the writer describes his clinical observations made on twenty-one patients since 1917 and comes to the following conclusions: (1) Autohemotherapy raises the biotonus of the organism in most of the patients. (2) In the majority of the patients with trachomatous pannus the injection of autoserum relieves the severe subjective symptoms. (3) Autohemotherapy is a simple, easy, generally accessible, supplementary method for the ophthalmologist. (4) The *modus operandi* of autohemotherapy on the human organism is not satisfactorily explained.

*Joseph I. Gouterman.*

Mussabeili, U. C. **Refractive condition with pterygium.** *Zeit. f. Augenh.*, 1930, v. 71, June, p. 237.

In the rather voluminous literature on pterygium the author could find nothing in the effect of this lesion on the refraction of the eye. Mussabeili examined the eyes of thirty patients with pterygium in which the lesion had not reduced vision by encroachment on the pupillary area. It produces a flattening of the cornea in the horizontal meridian, which increases the radius of curvature, and produces a decreased refraction with a resulting astigmatism

with the rule. The effect seems to be purely mechanical. *F. H. Haessler.*

Panico, E. **Pigment cells in the sclera of vertebrates.** *Ann. di Ottal.*, 1930, v. 58, April, p. 338.

While the pigment cells of the choroid, the iris, and the retina have been extensively studied, little attention has been paid to their presence in the sclera. The task of the author was an inquiry as to the frequency, size and relationship of pigment cells in the scleral tissue. He found in the sclerotic of many of the vertebrates that pigment cells were abundant. They were generally elongated, but in some regions were round and oval. They often were found in parallel lines separated only by a thin scleral fiber. They were abundant in the mammalia and the birds, rare in the amphibia and the fishes. (They were very abundant in certain types of fishes, such as the tarpon and swordfish.) In certain of the mammalia they were found in the scleral cribriform lamina. In whatever form found they may be considered analogous to those in the choroid. As they are so rare in many forms of the vertebrates, in these they may be considered of little physiological importance. In others in which they are abundant, they, like the uveal structures, serve as a protection against the luminous rays of the sun. (Bibliography.)

*Park Lewis.*

Rollet, J. **Tattooing of leucomas by intracorneal injection.** *Bull. Soc. Franç. d'Opht.*, 1929, v. 42, p. 289.

Four cases are reported in which leucomas were successfully tattooed by means of intracorneal injections of one percent India ink. An extremely fine needle was used and plunged obliquely into the corneal stroma, and the fluid slowly injected. The author advised against making too extensive injections at one time, in order to avoid interfering too much with the intracorneal circulation. For the same reason the tattooing fluid should not be too concentrated. The process can safely be repeated at intervals until the desired



effect is obtained. By this method the loss of coloring matter and the possibility of infection are less to be feared, due to the fact that only a single puncture is made.

*Phillips Thygeson.*

Szekely, Josef. **Crescentric widening of the cornea in the lid slit.** *Klin. M. f. Augenh.*, 1930, v. 84, June, p. 804.

The author describes his observations on an eye in which the cornea was enlarged laterally by the addition of a crescentric clear zone 1.5 mm. wide.

*F. H. Haessler.*

#### 7. UVEAL TRACT, SYMPATHETIC DISEASE, AND AQUEOUS HUMOR

Bistis, J. **Experimental sympathetic nerve heterochromia.** *Zeit. f. Augenh.*, 1930, v. 71, June, p. 235.

Bistis demonstrated rabbits at the 1927 meeting at Heidelberg in which heterochromia iridis had followed extirpation of the superior cervical sympathetic ganglion, and concluded that he had produced a true neurogenic heterochromia. At the International Congress in Amsterdam, Poos conceded that heterochromia had been produced, but felt that the lighter color of the iris resulted merely from a flattening of the tissue folds which were brought about by the miosis. To refute this, Bistis states (1) that the miosis induced by eserine does not produce a lighter iris (2) that histological study shows that actual depigmentation has taken place, and (3) that Angelucci in similar experiments observed depigmentation not only of the iris but also of the choroid.

*F. H. Haessler.*

Davenport, R. C. **The significance of Tay's choroiditis and allied conditions.** *Trans. Ophth. Soc. United Kingdom*, 1929, v. 49, p. 110.

Several clinical entities are apparently embraced under the name Tay's choroiditis. Some of these are gross lesions with much loss of visual acuity, while others appear to be cases of colloid body formation. With the latter class of cases the name of Tay has been mostly

associated. It would seem wise to frame some sort of classification which might aid in teaching and also give a sounder basis for prognosis. The author makes the following classification:

(1) Colloid body formation.

(a) Juvenile or possibly congenital.

(b) Senile (at least first seen in old people).

(c) Associated with gross fundus changes.

(2) Conditions simulating colloid body formation seen in the clinical picture.

In regard to the true colloid body formation seen in younger people the changes are mostly of the widespread type, and the vision is unimpaired.

In the cases simulating colloid body formation many cases in the early stages show only a few central discrete spots, but later, edema, hemorrhages and exudation take place, often going on to the formation of massive exudates. Invariably vision is depressed. It would seem wise never to give a good prognosis for vision in a case looking like colloid body formation, where the other eye shows any gross changes or where vision is at all affected.

Perhaps it would be sound policy to keep the name of Tay only for colloid body formation with unimpaired vision.

*A. B. Bruner.*

Hambresin. **Iris lacunæ in a case of glaucoma; biomicroscopical examination.** *Bull. Soc. Franç. d'Ophth.*, 1929, v. 42, p. 310.

Hambresin describes the iris appearance in a case of advanced bilateral simple glaucoma. Examination revealed the presence of extreme iris atrophy with many large lacunæ, some being of such size and shape as to resemble actual colobomata. Each eye presented, in addition, an avascular strand of 2 to 3 mm. in length which ran from the anterior face of the iris to the posterior surface of the cornea. A number of the relatives of this patient, also glaucomatous, were examined, but none showed the corresponding iris formations.

In considering the problem of pathogenesis of these holes in the iris, Hambresin states his belief that in addition to the action of the increased intraocular tension, the iridocorneal strands contributed to the formation of these holes by traction. The iris atrophy is probably secondary to the glaucoma. The author concludes that the strands are not congenital, but were produced by an adhesion between the corneal and iris surfaces, formed during a period of marked rise in tension.

*Phillips Thygeson.*

Johnson, G. L. **Obscure sympathetic phenomena.** Arch. of Ophth., 1930, v. 4, July, p. 90.

Two cases are reported. In one there was definite loss of vision and irritation of the conjunctiva, in the fellow eye of an eye removed two years previously, with a glass ball implantation. The loss of vision and the irritation subsided following removal of the glass ball.

The second case was one of so-called sympathetic keratitis. In this patient both corneas were infiltrated with extensive nebulæ. These were so dense that the vision was reduced to counting fingers at two meters in the right eye, and one meter in the left. Following an iridectomy on the right eye, both eyes were bandaged for four days. On removing the bandages with a view to an operation on the left eye it was found that the nebulous condition of the cornea had almost entirely disappeared in that eye. Iridectomy was unnecessary and vision was found to be six-ninths. Five ophthalmologists were witnesses to this remarkable observation. The author suggests the possibility of a sympathetic keratitis relieved by the operation on the fellow eye.

*M. H. Post.*

Souter, W. C. **A case of uveoparotid fever with autopsy findings.** Trans. Ophth. Soc. United Kingdom. 1929. v. 49, p. 113.

The paper gives a very full and complete case report. At the autopsy, seven

months after the patient was first seen, miliary tuberculosis was found.

The author then reviews the literature on the subject and adds a full and complete bibliography.

*A. B. Bruner.*

#### 8. GLAUCOMA AND OCULAR TENSION

Bailliant, P. **Clinical aspect of the relation between the general arterial pressure and the intraocular tension.** Bull. Soc. Franç. d'Opht., v. 42, 1929, p. 342.

Bailliant finds no parallelism between the general arterial pressure and the intraocular pressure. In chronic glaucoma an elevation of the general pressure is fairly frequent, but in acute glaucoma it is rare. In the latter it is quite customary even to find a general hypertension. There is, however, clinical interest in knowing the relationship between the two pressures. If the ocular tension is higher than the diastolic pressure of the retinal arteries, grave circulatory troubles occur with resultant visual damage. The tension in the retinal vessels can be estimated approximately by using a figure slightly less than half that in the brachial vessels. Consequently, whenever the ocular tension reaches or surpasses half the diastolic pressure in the brachial arteries there is immediate danger. This explains why certain hypertension patients are able to tolerate an intraocular tension approximately 45 to 50 mm. without visual danger.

*Phillips Thygeson.*

Fischer, F. P. **Status of the outer tunics of the eye in abnormal intraocular pressure.** Arch. f. Augenh., 1930, v. 103, June, pp. 1-75.

An attempt is made to determine the characteristics of the outer coats of the eye, particularly the sclera, during increased intraocular tension. The colloidal chemical structure of these coats under these conditions was studied, particularly the water content. The method is given in detail. In addition

to rabbits' eyes, fifty-one enucleated human eyes (twenty-six with normal tension and fifteen with glaucomas) were used.

In the human eyes, the water content of the sclera was lower in glaucomatous eyes than in normal eyes. The sodium chloride content, however, was higher. The sclera of glaucomatous eyes showed a higher degree of swelling in water, but a lower degree in organic acids or salt solution. The initial rate of swelling is much higher in eyes with increased intraocular pressure.

The index of refraction of the sclera of normal and glaucomatous eyes is the same under normal conditions, but in water the refractive index of glaucomatous eyes reaches a higher level.

*Frederick C. Cordes.*

Hamburger, Carl. **A contribution to the pathologic physiology of the eye.** *Klin. M. f. Augenh.*, 1930, v. 84, June, p. 821.

The author's reiterated theory that acute ciliary inflammation and glaucoma are two antagonistic processes has not yet been sufficiently appreciated. He reports observations on two eyes which he cauterized subconjunctivally over the ciliary region with silver nitrate, attaining a reduction in tension. Both observations show that an artificially produced ciliary inflammation can soften the eyeball. He believes that this is the lead that glaucoma investigation should follow, rather than search for new operative methods.

*F. Herbert Haessler.*

Passow, A. **The relation of the entire organism to primary glaucoma.** *Arch. f. Augenh.*, 1930, v. 103, June, pp. 111-160.

In the majority of glaucoma patients, there is a hyperfunction of endocrine glands together with symptoms of so-called "sympathicotonia". In the author's cases, there was a marked tendency to hyperfunction of the thyroid, even though it is fairly well established that glaucoma is not associated with

exophthalmic goiter. In frank thyrotoxicosis, the tension is normal in most of the cases. Consequently, glaucoma is not to be associated with thyroid disturbances although it may possibly be a polyglandular disturbance.

It can be taken for granted that the intraocular tension is influenced by hormones as well as through the nervous system.

The treatment of glaucoma with thyroid preparation is contraindicated as are any therapeutic measures that tend to increase an already high metabolic rate. The author particularly warns against the use of iodine preparations which are often used because of the arteriosclerosis. The usual modern treatment of thyrotoxicosis would seem to be indicated.

As the glaucomatous patients show a disturbance of equilibrium of the sympathetic nervous system, it is conceivable that ergotamin might be valuable. The above work in no way changes the present indications for miotics.

*Frederick C. Cordes.*

#### 9. CRYSTALLINE LENS

Kirby, D. D. **Exfoliation of the most superficial lamella of the anterior capsule of the crystalline lens.** *Arch. of Ophth.*, 1930, v. 4, July, p. 93.

Seven cases of this condition were observed by the author during seven years. Most of these cases gave the impression that some degenerative process, accompanied by rubbing of the iris back and forward over the lens capsule, produced the characteristic changes. The appearance is indicative of a degenerative and friable opaque lamella derived from the capsule of the lens. Occasionally, glaucoma is present, possibly due to detached particles obstructing the spaces of Fontana. In all cases reported there were senile cortical lens changes.

Vogt has observed forty-five cases of a similar condition, called by him "lens-capsule-glaucoma". He examined the eyes of one of these cases microscopically. Definite separation of the super-

ficial lamella from the capsule was present. Seventy-five percent of the cases reported by Vogt had glaucoma.

*M. H. Post.*

Knapp, A. **Three hundred cases of intracapsular cataract extraction with capsule forceps.** Arch. f. Augenh., 1930, v. 103, June, pp. 263-270.

Knapp gives the technique and results in 300 intracapsular cataract extractions in which the author's forceps were used.

The indications for this type of operation are important. It is applicable only in those cases in which the capsule is of sufficient thickness and toughness to permit a firm grasp. Consequently, patients under fifty years of age are excluded. The sclerosed lens with posterior cortical clouding is easily dislocated. The Morgagnian cataract is removed with difficulty because of the slipperiness of the capsule and its tendency to rupture.

The operation is contraindicated in prominent eyes, in eyes with vitreous changes, and in extremely nervous or ill-behaved patients. In these, the tooth forceps or cystotome should be used.

*Frederick C. Cordes.*

#### 9. CRYSTALLINE LENS

Millette, J. W. **An unusual sequela of the intracapsular extraction of the cataractous lens.** Ohio State Med. Jour., 1930, v. 26, Feb., p. 130.

The author cites seven cases of an unusually late sequela following intracapsular cataract extraction. The complication develops from four to eighteen months after the operation, and consists first in a change in the appearance of the anterior surface of the vitreous. Through a smooth pearl-like surface, the fundus reflex is seen to grow progressively fainter, and is finally lost, as the membrane becomes more dense, and as the deeper parts of the vitreous become involved. Discussion is of very little value in these cases as the affection involves the whole vitreous structure. All of the cases cited

were in diabetics, and the author believes that the diabetes may be a causative factor in the development of the vitreous change. *M. E. Marcove.*

Rauh, Walter. **Leaf-shaped and rosette-shaped cataract.** Klin. M. f. Augenh., 1930, v. 84, June, p. 766.

This form of lens opacity is well known since Vogt's studies of the splitting off of subcapsular lenticular opacities by the interposition of clear new fibers under the capsule. The opacity is very thin, the leaves of the rosette lie in one stratum of lens fibers, and, though they are usually in the cortex, they may be within the nucleus. The rosette may be complete and cover all of the lens except the equator, or may be developed in one direction from the axis only. The sutures are always clear. Vogt thinks the anomaly is traumatic in origin; Handmann, who has also observed a number of these cataracts, doubts this.

Rauh describes observations on seven such cataracts. All of them were in the cortex, though five were directly on the anterior plane of discontinuity between the cortex and nucleus. In all cases the entire rosette was in a single stratum. All of the seven cataracts were unilateral. The visual acuity may be normal, depending only on the density of the lens opacity; in other respects the eyes are normal. When visual acuity is good it is obvious that the patient readily forgets the trauma that may have caused the disease. In four of these patients trauma was the most likely cause. *F. Herbert Haessler.*

Rötth, A. and Klein, N. **The lens capsule and the intracapsular cataract operation.** Klin. M. f. Augenh., 1930, v. 84, June, p. 823.

Sixty-nine lenses which had been extracted intracapsularly with a Kalt forceps were studied histologically in order to determine the relation of the thickness of the capsule to the success of the operation. In general the capsule



is thicker in a cataractous lens than in a normal one of the same age. Even with a normal capsule thickness the operation can be done. More important than the thickness of the lens capsule are the tension and the elasticity.

*F. Herbert Haessler.*

Van Lint. **Some details concerning intracapsular extraction of cataract.** Arch. d'Ophth., 1930, v. 46, June, p. 380.

This article gives the writer's technique in detail for intracapsular extraction by the suction method. The section is made to the temporal side with the keratome and enlarged with scissors. A conjunctival flap is dissected up and replaced with two sutures. The temporal method of approach is considered superior to any other for suction extractions.

*M. F. Weymann.*

#### 10. RETINA AND VITREOUS

Bielschowsky, A. **An unusual case of vertical heterotropia of the macula.** Klin. M. f. Augenh., 1930, v. 84, June, p. 755.

Vertical deviation of the physiologic retinal center from the geometric retinal center is one of the greatest rarities. Aside from the few reports compiled by Triebenstein, the author could find only one other. The case of vertical heterotropia observed by the author is interesting not merely because of the rarity, but because a spurious hypertropia produced by the anomaly was in a direction opposite to a real hypertropia which existed in the patient. Furthermore, analysis was complicated by the fact that an examination of the blind spots showed that the optic discs were also heterotropic. The absence of choroidal lesions near the fovea ruled out the thought that the condition was brought about by traction by means of scar tissue, as was found in all other reported observations.

*F. Herbert Haessler.*

Fiore, Tito. **On the surgical cure of retinal detachment.** Ann. di Ottal., 1930, v. 58, March, p. 265.

The favorable reaction of the scleral tissue to the action of the actual cau-

tery leads the author, who has recently written of its use in glaucoma (see Amer. Jour. of Ophth., 1930, page 657), to suggest a similar method in detachment of the retina.

A Paquelin thermocautery with a sickle shaped point is employed. The lids are widely opened with a blepharostat, the eye is anesthetized with a four percent solution of cocaine with adrenalin, the conjunctiva is reflected back and the eye is turned up and back. When necessary the external rectus is retracted. The cautery point is raised to a white heat and drawn along the sclera over the detachment, from behind forward through its entire thickness, and the subretinal fluid released. The author considers this a more satisfactory method when the detachment is near the macula and is caused by a cysticercus, than an attempt at removal of the sac, for a part of the sac is likely to remain behind acting as a foreign body. The igneous opening allows gradual discharge of the sac. There are no cases reported in this preliminary note. A more complete presentation will follow later.

*Park Lewis.*

Koyanagi, Y. **The genesis of the fundus picture in chorioretinitis nephritica.** Klin. M. f. Augenh., 1930, v. 84, June, p. 737.

A careful study on more anatomic material confirms the author's view that alterations in the retinal vessels are but slightly, if at all, responsible for the fundus changes in retinitis nephritica. The factor of greatest importance in the production of the retinal change is severe damage to the short posterior ciliary arteries.

*F. Herbert Haessler.*

Livingston, P. C. **The surgery of the vitreous.** Brit. Jour. Ophth., 1930, v. 14, July, p. 330.

This is a preliminary paper dealing with an experimental investigation into surgery of the vitreous body with special reference to its application in cases of detached retina, primary vitreous disease, hemorrhage or traumatic loss of vitreous.

Seven dogs were used. The investigation was designed to prove whether or not a tolerance existed between the vitreous of animals of the same species and of animals of different species. Eyes of dogs, sheep, and pigs were used. The vitreous was obtained aseptically and within an hour of the time of slaughter. Following the separation of the conjunctiva the sclera was gently incised and a needle with a 2 mm. bore was inserted into the vitreous. The scleral incision containing the needle was guarded by two sutures to prevent leakage. About 1 c.c. of vitreous was removed, the syringe was detached and another syringe substituted containing a foreign vitreous. Too high intraocular pressure was guarded against.

Of the seven dogs subjected to operation, three were treated with pig's vitreous, one with sheep's vitreous, one as a control with its own vitreous removed and replaced, and two with vitreous taken from other dogs. Of the seven dogs operated upon, two eyes were lost, two retained useful sight, and three suffered visual loss (except for perception of light) without, however, experiencing marked reaction.

Pathologically the findings showed points of interest especially regarding the corneal changes. In no cases did the unoperated eye show gross or microscopic alterations. (Three illustrations of sectioned eyes. A table containing the postoperative findings and a résumé of the pathological findings of four eyes accompanies the contribution.)

*D. F. Harbridge.*

Majewski, K. W. **Concerning the mechanism of separation of the retina in myopic individuals.** *Arch. d'Opht.*, 1930, v. 47, May, p. 273.

The occurrence of spontaneous separation of the retina in highly myopic individuals may be explained upon a purely mechanical basis. This separation is more prone to occur in eyes not affected with a posterior staphyloma or retinochoroiditis, and more so in those which are enlarged in all directions. Calculations are presented to show the great increase in volume of an eye

affected with myopia, and also the increase in area of its retinal surface. With a myopia of fifteen diopters the volume of the vitreous is doubled if the globe is stretched equally in all diameters. Separation of the retina occurs when it can no longer stretch to cover the increased area of the scleral shell. The subretinal fluid is merely a transudate which fills the space created by the separation of the retina. Some very interesting tables and figures showing the increase in the volume and the area of a myopic eye accompany the article.

*M. F. Weymann.*

Mureddu, G. **Numeric relation of the visual to the ganglionic cells in the human retina.** *Ann. di Ottal.*, 1930, v. 58, March, p. 247.

The author, from a series of studies on the normal human retina, concludes that in a horizontal section passing through the fovea the number of ganglionic cells to each 100 visual cells is as follows:

(1) Toward the temporal side, at 0.5 mm., 65; at 1.0 mm., 65; at 3.0 mm., 15; at 5.0 mm., 10; at 10.0 mm., 4.

(2) Toward the nasal side, at 0.5 mm., 74; at 1.0 mm., 74; at 2.0 mm., 48.

The author considers that this arrangement has no functional value outside of the macula, because in the macula, owing to the disposition of the fibers of Henle, the visual cells of a given tract do not connect directly with the ganglionic cells of the same tract, but with those in a more distant area.

*Park Lewis.*

Richardson, Shaler. **Bilateral retinal detachment complicating toxemia of pregnancy;** case report. *Jour. of Florida Med. Assoc.*, 1929, v. 16, Dec., p. 266.

The author reviews the literature and finds in all cases reported that in addition to the detachment there were definite pathological changes present such as edema, perivasculitis, and hemorrhage. He explains the mechanics of this complication of pregnancy by the fact that the choriocapillaris secretes a serum identical with

that serum which is part of the general anasarca, mechanically forcing the retina from its normal resting place.

The case reported was in a primipara who for eight and one-half months had had an uneventful pregnancy, when suddenly the blood pressure rose and generalized edema appeared. Spots were noticed before both eyes, and the vision gradually diminished to counting fingers. Labor was induced, and the woman was delivered of a normal baby. The following day examination showed a large serous detachment below the disc in the right eye and above the disc of the left eye. The next day examination showed that the detachment in each eye had increased, and vision had dropped to light perception. Under local anesthesia a combined scleral trephine and chorioidialysis of both eyes was done the same day.

The procedure consisted of making a conjunctival flap, removing a one and one-half millimeter disc of sclera with a trephine, separating the choroid from the sclera through the trephine opening for about eight to ten millimeters with a spatula, then making an opening through the choroid several millimeters from the trephine opening. The opening in the sclera was made as near over the apex of the detachment as possible.

Postoperative care consisted in absolute rest and dehydration. On the fourth day the retinae were reattached. After three weeks in bed the patient left the hospital, the reattachments holding and the vision 20/40 in each eye. Form fields were full. Three months later, the vision became 20/30 in each eye with a new correction and the form fields were still full.

*Maurice Marcove.*

Rohner, M. **Retinal lesions with good prognosis.** *Klin. M. f. Augenh.*, 1930, v. 84, June, p. 748.

The prognosis of lesions of the retina is usually grave. The author observed two cases of juvenile phlebitis retinae in which the lesion caused minimal symptoms and disappeared without trace. In two other eyes he saw lesions that resembled those of phlebitis; they

involved only the inner retinal layers, left the pigment epithelium intact, were certainly acquired and yet remained stationary. In a fifth eye, lesions such as one sees in retinitis albuminurica have remained stationary for seven years, though the patient is entirely well and is free from signs of general disease.

*F. Herbert Haessler.*

Rubbrecht, R. **The closure of tears in the retina.** *Arch. d'Opht.*, 1930, v. 47, March, p. 160.

After having located the tear which one wishes to close after the procedure of Gonin, the area of operation is localized as follows. While looking at the tear, the operator's line of sight is made to fall on the margin of the pupil nearest the tear, with the cornea under holocain anesthesia, and a mark with India ink is made at the limbus opposite this point. By sighting along the margin of the pupil most distant from the tear a second mark is made at the limbus opposite this point. Connection of these two points gives one the meridian of the tear. The distance from the ora serrata is estimated in disc diameters. One considers the ora serrata 8 mm. from the limbus, and 1.5 mm. is added for each disc diameter of estimation.

In operating, one does a temporary resection of the external or internal rectus muscle for fixation purposes. A suture is passed through the mark at the opposite limbus and the thread is stretched across the cornea over the second mark. The estimated distance from the limbus is measured on this meridian and a mark is made on the sclera at this point with India ink. The sclera has been previously uncovered by dissecting up a conjunctival flap.

Using this mark as a midpoint, a linear incision of a length of 5 mm. is carefully made along the meridian through the sclera. The incision is made layer by layer just down to the choroid. The latter is then carefully incised to allow the escape of the sub-retinal fluid. Then the fine point of the galvanocautery at red heat is quickly passed along the entire extent

of the incision. The tip is not plunged into the vitreous but just comes in contact with the detached retina. The resected muscle is sutured in place and the conjunctival flap is closed. A binocular bandage is applied for twenty-four hours and one drop of atropin is instilled daily. The patient should remain in bed eight days.

*M. F. Weymann.*

Schoenberg, Mark J. **The Gonin operation for detachment of the retina.** *Arch. of Ophth.*, 1930, v. 3, June, pp. 684-694.

Success in the Gonin procedure of ignipuncture for detachment of the retina depends upon (1) the selection of suitable cases, (2) the accuracy of the technique, and (3) the cooperation of the patient. Suitable cases are those of recent date in which the detachment is not too extensive and there are only a few small tears, so located as to be accessible to the puncture. The situation of the tear must be carefully plotted. Schematic drawings upon which the localization may be made accompany the paper.

Such drawings being made, the pupil is widely dilated and good local anesthesia is produced by holocain and cocaine instillations, followed by two percent procain hydrochloride, with a few drops of epinephrin hydrochloride introduced subconjunctivally. Next a black silk suture is passed in and out through the conjunctiva in such a manner that the continuation of this suture in a straight line would pass through the area of operation. The conjunctiva is then incised and pulled apart over the area to be operated on and the sclera incised in a meridional direction. After slight leakage of the vitreous has ceased, the cautery at white heat is introduced into the wound for from 3 to 4 mm. and kept there for from two to ten seconds and slowly withdrawn. The conjunctiva is sutured and an ophthalmoscopic examination is made.

The patient should remain in bed for six days in such a position that the vitreous presses against the wound.

During this time the foot of the bed should be raised twelve inches. The patient's bowels should not move during this time. One more week of rest, chiefly in bed, completes the after treatment.

The author reports six unsuccessful cases and four successful ones.

*M. H. Post.*

#### 11. OPTIC NERVE AND TOXIC AMBLYOPIAS

Goldmann, H. **A new industrial retrobulbar neuritis.** *Klin. M. f. Augenh.*, 1930, v. 84, June, p. 761.

A "Duco" sprayer's helper, who worked without a mask, became afflicted with a typical acute retrobulbar neuritis which healed completely in nineteen days after the patient was removed from the paint-spray vapor.

*F. Herbert Haessler.*

Goldstein, I., and Wexler, D. **Acute tuberculous periphlebitis of the retina and optic nerve.** *Arch. of Ophth.*, 1930, v. 3, May, pp. 552-559. (See Section 10, Retina and vitreous, September issue.)

Hippel, E. **Ophthalmological experiences in the treatment of brain tumors.** *Arch. f. Augenh.*, 1930, v. 103, June, pp. 76-91.

Hippel reviews a series of 167 cases of choked discs followed by operative procedure. From this series, he draws several conclusions.

The choked disc is the result of increased intracranial pressure. Consequently, it recedes promptly when this pressure is reduced. An important conclusion is that with a recession of the choked disc, normal vision is to be expected only in these cases in which the function was normal before operation. As to indication for operation: if the choked disc is a very recent one and the vision is normal, one is justified in waiting longer for positive neurological findings, providing the patient can be watched carefully. Where there is any doubt as to the status of the disc, operation should be recommended before vision is impaired.

*Frederick C. Cordes.*



Jaensch, P. A. **The treatment of tabetic optic atrophy.** *Zeit. f. Augenh.*, 1930, v. 71, April, p. 12.

The author records his therapeutic experience with thirty-four patients afflicted with tabetic optic atrophy, because it seems unlikely to him that any one observer or clinic will have enough material to come to reliable conclusion on the efficacy of various forms of treatment. In no case did he observe any improvement of vision. The Swift-Ellis therapy did increase the average length of time before complete blindness ensued. However, in several cases a rapid deterioration of function occurred with treatment, and the sub-occipital injections themselves are not without danger. The really important therapeutic measure is prophylaxis in the form of rigorous treatment of early syphilis. For treatment of patients in whom optic atrophy has begun, the author prefers potassium iodide and bismuth to the newer therapeutic agents.

*F. H. Haessler.*

Levinsohn, L. **My theory of the pathogenesis of choked disc.** *Klin. M. f. Augenh.*, 1930, v. 84, June, p. 759.

This is a polemical reply to Schieck. Levinsohn stated his theory in 1906 and emphasized that choked disc results neither from a transference stasis of intracranial cerebrospinal fluid nor from an inflammatory change in the fluid. It results rather from a stasis in the normal egress of fluid from the optic nerve, which is produced by mechanical compression of the perivascular lymph vessels of the central retinal blood vessels in the vaginal sheath of the optic tract. Levinsohn states that Schieck has modified this theory only in that Schieck believes to have proved that the increased intracranial pressure forces the fluids circulating in the pial sheet of the optic nerve into the axial fiber bundles. Levinsohn suggests not only that this modification is inaccurate, but that in any case it would not justify Schieck and others in attaching Schieck's name to the theory. *F. Herbert Haessler.*

Meyer, Hellmuth. **Incongruence between choked disc and the underlying**

disease. *Klin. M. f. Augenh.*, 1930, v. 84, May, pp. 671-678. (5 ill.)

In intracranial processes the intensity of papillitis generally corresponds with the conditions of intracranial pressure, as shown in spontaneous fluctuations of the original processes and after operative decompression. There are, however, exceptions. An instructive case of otitic brain abscess, observed by Körner and Axenfeld, is cited, in which the papillitis reached its acme after successful operation, increasing in spite of good general condition and improvement of all other symptoms, and then after two weeks spontaneously decreasing. In a case of serous meningitis, all symptoms, including the condition as to vision and visual fields, were ameliorated, whereas the papillitis increased with hemorrhages. This is explained by slow subsidence of the nerve swelling, during which sequels of tissue damage from pressure may set in secondarily. The more rapid improvement of central vision is due to a relative preservation of the papillomacular bundle. *C. Zimmermann.*

Michail, D. **Unilateral angiospastic paralysis of the third nerve with bilateral papilledema following a blow on the occiput.** *Arch. d'Ophth.*, 1930, v. 46, June, p. 385.

A patient, fifty-two years of age, received a blow on the occiput and lost consciousness for two hours. He later had diplopia and severe headache for which he consulted the writer. A bilateral papilledema with normal vision and a paresis of the superior left oblique muscle was found. One month later the patient became unconscious after a fit of laughter. Six days after that the papilledema and headache had diminished, and eighteen days later all eye findings were normal. The papilledema was explained on the basis of hypersecretion of spinal fluid, and the motor paralysis was thought to be due to an angiospasm induced by the injury. The fit of laughter was thought to have produced a disturbance which relieved the angiospasm and caused a sudden return of the motor nerve to normal function.

In such cases, therefore, antispasmodic treatment is indicated.

*M. F. Weymann.*

**Sanna, G. Concerning the form of the dural sheath of the optic nerve at the level of its scleral insertion in the human eye.** *Ann. di Ottal.*, 1930, v. 58, March, p. 239.

The author points out the fact that in the normal human eye there is a diversity of form in the dural sheath of the optic nerve, both in the nasal and temporal sectors, in regard to its thickness, its structure and its mode of insertion in the sclera. On the temporal side the sheath is of greater thickness due to the fact that the nasal side is constituted of compact connective fibers which are continuous with the most external scleral fibers, while the temporal side is constituted of (1) an internal compact layer which continues rather indefinitely into the internal scleral and pial fibers, and (2) of an external layer of loose fibers that are continuous with the external scleral layer. The middle scleral fibers cease abruptly and form a circle, thus surrounding on the outside the more compact layer and delimiting it with a sulcus. These variations in the sheath give a greater thickness to the sclera on the temporal side and a greater amplitude of the intermarginal cul-de-sac on the nasal side. (Illustrations.)

*Park Lewis.*

**Whiting, Maurice. Optic atrophy following hemorrhage from the alimentary tract.** *Trans. Ophth. Soc. United Kingdom*, 1929, v. 49, p. 144.

The occurrence of a condition resembling optic neuritis and followed by optic atrophy has been a well recognized complication of some cases of severe hemorrhage from the alimentary tract and elsewhere. Five cases are added to those already reported in the literature. A few of the points of interest in the numerous cases reported are noted: (1) The condition may follow hemorrhage from any source, but is most common after hemorrhage from the alimentary tract and uterus. (2) The hemorrhage may be a single large one

or repeated smaller ones. (3) It seems to occur very rarely in hemorrhages due to trauma. (4) The fundus changes reported are of a varying character, from pallor and slight blurring of the disc to an apparently definite optic neuritis with hemorrhages and exudates. (5) The first state is probably not a true optic neuritis, but is more likely due to sudden death of the ganglion cells and nerve fibers, and the final condition is apt to appear as a simple rather than a secondary optic atrophy. (6) The severe anemia due to excessive or prolonged blood starvation would seem to be sufficient cause to explain the optic atrophy.

*A. B. Bruner.*

**Worms and Sourdille, Gabriel. The importance of papillary stasis in the diagnosis between epidemic encephalitis and cerebral tumor.** *Arch. d'Opht.*, 1930, v. 47, April, p. 193.

In March, 1923, a man aged twenty-seven years suffered with a febrile attack, joint pains, internal strabismus, and sweating. A diagnosis of epidemic encephalitis was made and recovery occurred under treatment with sodium salicylate. In 1924 the patient had another attack which was also ascribed to encephalitis. In 1926 there was noticed for the first time a bilateral stasis of the papilla. Lumbar puncture showed increased pressure with 1.9 cells per cubic millimeter. In January, 1927, a decompression was done to prevent loss of vision. In 1928 there was no papilledema. In 1929 headaches reappeared with papilledema. Ventriculography showed the presence of a left temporal tumor. This was removed with a good result. Using this case as an example attention is called to the necessity of excluding the diagnosis of tumor in cases of encephalitis showing papilledema. Ventriculography is of great help in making such a differential diagnosis.

*M. F. Weymann.*

## 12. VISUAL TRACTS AND CENTERS

**Barletto, V. On two cases of homonymous hemianopsia and of homonymous quadrant anopsia of cortical origin.** *Ann. di Ottal.*, 1930, v. 58, April, p. 353.

Of the two cases reported, one of hemianopsia and one of quadrant anopsia, the two visual fields were almost symmetrical in each case but differing slightly in area; the first was directly vertical, the second narrowed and invaded both segments of the superior area as well. With integrity of the macular field in the first instance and absence of general symptoms, a thrombosis of the anterior choroidal plexus was eliminated, because this is never dissociated with hemianesthesia or a form of hemiplegia. The occlusion of the sylvian area on the left side would have produced a focus of softening with aphasia or apraxia, that, however light, may always be discovered by careful examination. This left only the posterior occipital region. In the absence of anatomical verification there could be no doubt of an involvement of the inferior border of the calcarine fissure.

In the second case, unlike the first, a cerebral thrombosis or embolus was unlikely, because the anopsia as shown by the campimeter would have been produced by the partial destruction and softening of the area supplied by two arteries, one from the sylvian region and the other from the posterior cerebral region. A common cause of the obstruction of cerebral vessels is endarteritis obliterans luetica, to which the anopsia in this case was ascribed.

*Park Lewis.*

Cushing, Harvey. **The chiasmal syndrome of primary optic atrophy and bitemporal field defects in adults with a normal sella turcica.** *Arch. of Ophth.*, 1930, v. 3, May, p. 505, and June, p. 704.

The present study has to do with a consideration of suprasellar tumors which result in, or tend toward, primary optic atrophy and bitemporal hemianopsia. Of these, the suprasellar meningiomas are the most favorable for operation. Their diagnosis before operation is still very uncertain. The attachment of these tumors lies over the chiasmatic sulcus and tuberculum sellae, and when freed here the remainder of the growth can usually be removed in toto. Fifteen cases have

previously been recorded and two more accompany the present paper. The author calls attention to the need of destroying all cells retained at the point of attachment of the tumor to the dura and recommends electrosurgical coagulation of the remaining cells. Yet in none of the cases so far operated on has there been any recurrence.

Adenomas of the anterior lobe of the hypophysis are the most common tumors showing bitemporal field defects with primary optic atrophy. Some of them do not result in any enlargement of the fossa. They may arise from the stalk above the diaphragm, or may break through the diaphragm so easily that constitutional symptoms do not appear, the visual disturbances only being present.

Chromophobe adenomas have been encountered at operation. One case is reported in detail. The syndrome was similar to that of a suprasellar meningioma. In differential diagnosis between adenomas and meningiomas, it should be noted that there is greater atrophy of the sella in the former, and in adenomata there are usually mild hypopituitary signs and more rapid progress of the symptoms.

Craniopharyngiomas are congenital tumors that arise from faulty closure of the hypophysial duct. They frequently give symptoms in childhood and are characterized by deposits of lime salts which may vary greatly in size. Such deposits, however, are found in meningiomas and even in adenomata. Craniopharyngiomas are more common than formerly believed. They vary greatly in size and symptomatology, and yet these tumors are relatively easy to diagnose. Two cases are reported. Removal of these tumors is difficult; evacuation of the cyst is the safest procedure, though eventual refilling almost uniformly takes place.

Gliomas of the chiasm may spread forward as far as the optic nerve head. They may show the typical chiasmal syndrome in question, but there are certain distinguishing characteristics. They are, for the most part, restricted to childhood and are usually associated

with Recklinghausen's disease. The field defects are frequently queer, though bitemporal in their general effect. Definite vertical hemianopsia is unusual. The optic atrophy is frequently accompanied by elevation of the disc, due to extension of the tumor mass. The sella frequently has a pear-shaped forward expansion, due to enlargement from pressure of the optic foramina, easily demonstrated by proper x-ray pictures. These tumors frequently involve the wall of the third ventricle, with symptoms of hypothalamus, and finally hydrocephalus. The only surgical intervention possible is the removal of occasional pedunculated outgrowths. Two cases presented typical vertical hemianopsia.

Suprasellar aneurysms occasionally occur with similar findings. They are small, pea size as a rule. But now and then larger ones may be exposed at operation. Two cases are reported. It is suggested that in the future obliteration may be successfully practiced by the insertion of a considerable number of muscle stamps. These saccular aneurysms are without audible sound. Pressure erosion of bone should be looked for in suspected cases.

Chordoma is an extremely rare lesion, one case of which is reported. The field defects in this case were located in the lower temporal quadrants.

In the absence of tumor, the chiasmal syndrome has been found accompanied by an excess of fluid, with apparent thickening of the walls of the cisterna chiasmatis. The term "chronic arachnoiditis" has been applied to these lesions for some years in the author's clinic. Removal of the fluid was without result, probably because the underlying factor was not removed. The author suggests that it is possible that inflammatory processes in the accessory paranasal sinuses may result in mild meningeal reaction in the chiasmal cistern in the same way that the cerebellopontine cisterna is well known to be affected by acoustic tumors. But great caution should be used in ascribing disturbances of vision and fields to the paranasal sinuses.

There are three major diagnostic groups: (1) Craniopharyngioma—a diagnosis made 67 times, correct in 45 cases. Glioma of the chiasm was found in 8, pituitary adenoma in 10, suprasellar meningioma in 2, and arachnoiditis in 2. (2) Pituitary adenoma was diagnosed in 42 cases, of which nine were incorrect. In these, craniopharyngioma was found in 3, suprasellar meningioma in 2, tumor of the third ventricle in 2, and unverified lesions in 2 cases. (3) Meningioma was recorded 23 times correctly and 17 times incorrectly. Of these latter, 7 were pituitary adenomata, 6 were craniopharyngiomata, 2 were aneurysms, and arachnoiditis was present in 2 instances.

Three diagnostic points should be carefully considered: (1) The character of the primary optic atrophy. (2) The bitemporal character and progress of the field defects, as checked by very careful fields. (3) The question of normality of the sella turcica should be most carefully answered.

Differential diagnosis shows that suprasellar meningiomas present the syndrome in its purest form. Pituitary adenomas give symptoms more rapid in onset, and show as a rule some degree of sellar atrophy. Suprasellar craniopharyngiomas are likely to show some degree of calcification and also symptoms of hypothalamus.

Gliomas rarely occur in adults. The fields are rarely so characteristic, and x-ray pictures show enlargement of the optic foramen. Hypertension points to suprasellar aneurysm. And finally, large central scotomas point to retrobulbar neuritis, or some process other than tumor.  
*M. H. Post.*

Dejean, Ch. **Binasal hemianopsia.** *Arch. d'Opht.*, 1930, v. 47, April, p. 219.

Binasal hemianopsia is a rather rare condition and has been reported as occurring in the course of bilateral optic atrophy with changes in the papillæ, and as a result of pressure exerted on the lateral portions of the chiasm by atheromatous vessels or other lesions. A seven year old child was seen with a bilateral hemianopsia which had



passed the fixation point. At two years of age he had suffered from attacks of convulsions and unconsciousness. Since his third year he had had no more of these, but there had been a gradual loss of vision. Examination showed slight changes in the anterior clinoid processes of the sella turcica. The fundi appeared normal. It was considered that the child had had meningitis at the age of two years and that the organization of exudate in the region of the clinoid processes slowly compressed the chiasm, causing the binasal hemianopsia.

*M. F. Weymann.*

Sedillot, Jacques. **Anatomical and clinical proofs of a mechanism of the hypophysis in ophthalmic migraine and ophthalmoplegic migraine.** Arch. d'Opt., 1930, v. 47, April, p. 209.

The scintillating scotoma of migraine is explained by an engorgement of the hypophysis, which causes an irritation of the fibers in the optic chiasm. The prolonged pressure upon these fibers later causes the scotoma, which is often of a hemianopic type. This scotoma is negative in contrast to the positive scotoma which would be produced if there were spasm of retinal vessels. Another proof that the lesion is not in the retina is found in the case of Plateau, who, even though blind from a choroiditis, continued to have a scintillating scotoma. In ophthalmoplegic migraine there is frequently a syphilitic infection present. The engorgement of the hypophysis compresses a nerve which is already damaged by syphilis and causes a paralysis. Eventually this paralysis becomes complete as the syphilitic infection advances. Thus engorgement of the hypophysis may explain the phenomena associated with both types of migraine.

*M. F. Weymann.*

Tron, E. Z. **A case of isolated tract and chiasmal lesion.** Russkii Opt. Jour., 1930, v. 9, April, pp. 449-459.

The patient, forty years of age, with a history of a syphilitic infection in the past, complained of progressive loss in

sight and severe headaches. The changes in the visual fields associated with the decrease of central visual acuity were right homonymous quadrant hemianopsia with a complete loss of the lower quadrants and central hemianopsic scotomata in the upper quadrants. A lesion of the left optic tract in the area of the second neuron was suspected. Subsequently a tendency to bitemporal visual field defects, indicating an involvement of the chiasm, was found. The probability of the existence of the latter condition was strengthened through the intercurrent of a simple optic nerve atrophy. The diagnosis was then changed to that of a lesion of the first neuron, namely, of the chiasm and adjoining part of the left optic tract. The use of iodides in large doses resulted in a prompt visual improvement, and the author assumes a syphilitic etiology.

*M. Beigelman.*

Van Heuven, G. J. **Experimental-anatomical investigation of the cortical optical projection of the Java monkey.** Doctorate thesis, Amsterdam.

Some years ago Brouwer, Zeeman, and Sjaaff published their special investigations regarding the projection of the retina in the external geniculate body of the Java monkey (*Macacus*). They found that the ganglion cells of the upper half of the retina sent their fibers to the medial part of the external geniculate body, while those from the lower half went to the lateral part, the macular projection being between the two. The extreme nasal part of the retina, which represents the monocular external sickle of the visual field, must be represented along the ventral border of the opposite external geniculate body.

The striate area in the monkey begins at the lateral side, almost directly behind the "Affenspalte", and occupies the surface of the posterior lobe. It then bends medialward along the upper border and posterior pole; at the beginning of the calcarine fissure it follows around this fissure, so that only a small zone at both sides of this groove reaches the surface.

Van Heuven used only Java monkeys (*Cynomolgus fascicularis*). Lesions were made in the striate area and, as much as possible, were limited to the cortex. This was much more difficult on the medial surface, the most forward part of which could not be reached. Small young animals withstood the operation better than old ones. Nine animals were examined seven to nine months after the operation. In the geniculate body, the ganglion cells corresponding with the cortical lesions had disappeared. Shrinking of the degenerated parts of the geniculate body had not taken place.

Combining the results of Brouwer, Zeeman, and Sjaaff with his own, Van Heuven found that the upper half of the peripheral retina corresponded with the medioventral part of the external geniculate body, and with the upper lip of the calcarine fissure. The lower half of the peripheral retina is represented in the ventrolateral part of the external geniculate body, which corresponds with the lower lip of the calcarine fissure. The upper half of the macula corresponds with the mediodorsal part of the external geniculate body and the upper lateral part of the striate area. The lower half of the macula corresponds with the dorsolateral part of the external geniculate body and with the lower lateral part of the striate area.

The location of the retina on the striate area is found therefore along the horizontal meridian. Through the chiasmal crossing a division along the vertical meridian is given which leads to the cortical quadrant localization of the retina (macula and periphery). Lesions of the lateral surface as well as of the medial (being either in the upper or lower lip of the calcarine fissure) show corresponding zones of cell degeneration in the basal cell layer of the geniculate body. It is therefore impossible to demonstrate a circumscribed localization of this region in the striate area.

Theoretically the cortical projection in man should be constructed as follows: The caudal half of the optical cortex would be entirely for macular

projection. This region would extend wedgelike, becoming smaller toward the oral end. The upper part of the retina would be projected in the upper lip, the lower retinal half in the lower lip of the calcarine fissure. This projection of the peripheral retina would exist only in the oral half of the striate area and both zones would remain separated within the depth of the calcarine fissure by the fibers of the macular region.

These investigations of the Java monkey are in accord with Putman's examinations of human brains. The total surface was found more extensive than was accepted by the adherents of the theory of a localized macular projection. This large surface area of the cortical macula well explains the exclusion of the macula in the cortical hemianopic field, inasmuch as a part of this extensive macular projection area usually remains uninvolved.

(The thesis is liberally illustrated.)

*E. E. Blaauw.*

### 13. EYEBALL AND ORBIT

Buffington, W. R. **Ocular tuberculosis.** New Orleans Med. and Surg. Jour., 1929, v. 82, no. 6, Dec., p. 372.

Tuberculosis can attack any part of the eye or its adnexa. The conjunctiva may be primarily or secondarily involved. In some respects it may resemble trachoma except that the preauricular glands are involved. Chalazia have been classified as tuberculous, because histologically they contain giant cells, round cell infiltrations, and epithelioid cells. Phlyctenular disease has been considered to be due to tuberculosis, but is probably only a nutritional disease.

Involvement of the cornea, although rare, is usually an extension from disease of the anterior uveal tract. The uveal tract is in the most frequent site of involvement, then the choroid, ciliary body, and iris in the order of frequency. Retinal tuberculosis is rare.

Tuberculous iritis, iridocyclitis, or exudative choroiditis is always chronic. Any case of chronic uveitis which does not clear up under specific treatment,

or after removal of foci of infection, must be regarded as tuberculous. Tuberculin is used as a diagnostic agent both subcutaneously and intradermally. The local, focal and general reaction must be carefully watched. Tuberculin should be used very cautiously, especially in disease involving the posterior segment of the globe.

*Maurice Marcove.*

Collins, E. T. **Formative fibrous tissue reaction in the eye.** Trans. Ophth. Soc. United Kingdom, 1929, v. 49, p. 166.

The paper discusses in detail the form of reaction in the tissues of the eye which results in a new formation of fibrous tissue—a form of reaction which, though frequently associated with inflammation, may occur apart from it.

Fibrosis is met with as a form of reaction in connection with several different alterations of environment in the tissues of the eye, and these may be suitably divided up for purposes of description under the following headings:

- (1) Encapsulating fibrosis
  - (a) In connection with foreign bodies
  - (b) In connection with neoplasms
  - (c) In connection with parasitic cysts
- (1) Postfibrinous fibrosis  
In connection with blood clots
- (3) Reparative fibrosis
  - (a) In connection with developmental defects
  - (b) In the healing of wounds
  - (c) As a sequela of granulomatous inflammation

This paper is well worth a careful reading although too lengthy to review in detail. The author does, however, state certain general pathological propositions which are well worth reprinting in full.

1. A formative fibrous tissue reaction is one of the means which the tissues of the body have of counteracting deleterious influences in their environment.

2. Such a formative fibrous tissue reaction may be excited apart from any

exudation of leucocytes, though at times it is associated with it.

3. An aseptic foreign substance implanted in the body, which excites no exudation of leucocytes, may give rise to a formation of fibrous tissue which encapsulates and fixes it.

4. All neoplasms, when they come into contact with tissue of mesoblastic origin, excite a formative fibrous tissue reaction which tends to check their extension into surrounding parts. In slowly growing neoplasms it succeeds in encapsulating the new growth. In rapidly growing neoplasms the cell proliferation outpaces the formative fibrous tissue reaction, and the growth assumes malignant characteristics.

5. Any remedial treatment of neoplasms should aim, not only at checking the proliferative activity of the cells of which it is composed, but also at promoting the fibrous tissue formation.

6. Parasitic cysts which come into contact with tissue of mesoblastic origin excite a formative fibrous tissue reaction, which results in their encapsulation in a fibrous tissue covering.

7. Coagulated blood in some situations in the body may act like a foreign substance, and excite a formative fibrous tissue reaction.

8. A formative fibrous tissue reaction may be excited in the repair of lesions in the tissues of the body, due either to defective development, traumatism or destructive inflammation.

9. The new formation of fibrous tissue in the conjunctiva in trachoma is a secondary and reparative process which persists, tending to replace the fibro-adenoid layer which is destroyed.

10. The new formation of fibrous tissue in the conjunctiva in spring catarrh is a secondary reaction, excited by the proliferation and downgrowth of the epithelium; it entirely disappears when the disease comes to an end.

*A. B. Bruner.*

Elschnig, Herman. **Exenteration with secondary enucleation.** Klin. M. f. Augenh., 1930, v. 84, June, p. 829.

In order to avoid the danger of infection which attends enucleation of an

eyeball destroyed by panophthalmitis the author advocates the following method of operation: Without injuring the conjunctiva, he cuts away the cornea, cures out the entire contents of the bulbus, and copiously irrigates the empty scleral sac with Pregl's solution. He then enucleates in the usual way. He believes that the chances of orbital infection are greatly reduced, healing is assured and healing time is greatly shortened.

*F. Herbert Haessler.*

Golowin, S. S. **On the technique of roentgenographic localization of foreign bodies in the orbit.** *Russkii Opht. Jour.*, 1930, v. 9, April, pp. 444-448.

For the localization of intraorbital foreign bodies Golowin suggests the insertion of two pins three centimeters long into the orbit at its lower-inner and lower-outer angles. A lateral roentgenographic study is then made. A case is reported in which the usual routine technique of orbital roentgenography failed to show the position of the foreign body, while the use of the author's method resulted in its exact localization in the upper orbital wall near the apex.

*M. Beigelman.*

Weekers, L. **Treatment of painful eyes which still possess vision by the orbital injection of weak concentrations of alcohol.** *Arch. d'Opht.*, 1930, v. 47, May, p. 299. (See *Amer. Jour. Ophth.*, 1930, Aug., p. 740.)

#### 14. EYELIDS AND LACRIMAL APPARATUS

Cattaneo, D. **On operative intervention in dacryocystitis, dacryocystorhinostomy.** *Ann. di Ottal.*, 1930, v. 58, March, p. 203.

In chronic dacryocystitis the classical procedures of Bowman and Anelio have today somewhat fallen in disrepute, while in the newborn a cure is often effected by simple pressure with the finger on the sac or by a single use of the probe. When radical measures are required many surgeons prefer some form of rhinostomy to removal of the sac and of the lacrimal gland. The

author describes in great detail the original method of Toti and the many modifications that have followed it.

In his own procedure the clinical anesthesia is given as in dacryocystectomy. For the nasal mucous membrane, a strip of gauze from 25 to 30 cm. in length, saturated with a solution of five percent cocaine and ten percent adrenalin, is introduced in the nasal cavity. An incision 25 mm. long is made in the integument as in dacryocystectomy. The sac is isolated and a section made at the nasal extremity. The superior maxilla is trephined at the apophysis directly in front of the crest of the lacrimal bone and an opening is made 10 mm. broad and 15 mm. in height. A forked incision is then made on the nasal side of the sac with a longer segment in front. With a long thin knife the nasal mucous tissue is loosened in the opening except at the posterior portion so that a rectangular segment rests on the posterior surface. The membrane is then sutured with catgut over the posterior and anterior part of the osseous opening. The dermal opening is closed with three sutures.

The author gives extensive tables of various methods employed. He confirms a previous report in having secured successful results in 95.77 percent of the cases operated upon, of which 88.73 percent were completely relieved and 7.04 percent partially relieved; 4.22 percent were failures. In two cases a conjunctivitis persisted as in the unoperated eye. (Extensive bibliography.)

*Park Lewis.*

Elschnig, A. **Fat hernias of the lower lids.** *Klin. M. f. Augenh.*, 1930, v. 84, June, p. 763.

A number of different anomalies are frequently lumped together and called fat hernia, or tear sac of the lower lid. In young persons one frequently finds a mass of fat shimmering through the intact fascia-muscle layer. Pressure on the eyeball can cause the fat to protrude. It is probably analogous to the congenital ptosis adiposa or epiblepharon of the upper lid. With increas-



ing age the fascia-muscle layer becomes thinner and one gets an actual prolapse of fat through this tissue into the space beneath the thin atrophic skin. Frequently the fat mass is so large that it can be grasped with the fingers.

Elschnig considers the primary anomaly to be the disposition on the part of the fat to protrude, since it is distinctly separated from the orbital fat. The opening in the fascia is a secondary manifestation. The condition is also seen in hyperthyreosis, myxedema, nephritis and uncompensated cardiac lesions. It only appears, however, with a large orbital opening and a high position of the bulbus, and it is questionable whether its basis is not the protrusion of the primary fat roll. Another condition is the very rare trophoneurosis, which is called blepharochalasis when it involves the upper lid. It is possible to excise this fat pad successfully under local anesthesia.

*F. Herbert Haessler.*

Hallauer, C. **Clinical and experimental examination of the lysozyme content of the conjunctiva and lacrimal fluid.** *Arch. f. Augenh.*, 1930, v. 103, June, pp. 199-214.

In 120 cases the lysozyme content was tested in both normal and pathological cases. The greater portion is derived from the lacrimal gland. The lysozyme content is reduced by a general illness and also secondarily by any increase in lacrimation. Atropin, through its tendency to reduce secretion, increases the concentration; pilocarpin, through its opposite action, tends to decrease the lysozyme concentration.

*Frederick C. Cordes.*

Krachmalnikov, L. L. **On cysts of the lacrimal gland.** *Russkii Opht. Jour.*, 1930, May, pp. 680-685.

The author observed two cases of bilateral dacryops with a tendency to distension during lacrimation. In one case a histologic examination of the dacryops, removed with a part of the lacrimal gland, revealed an extensive round cell infiltration near the blood vessels and the lacrimal ducts. A narrowing

of the latter was most probably responsible for a retention of tears, with the formation of a cyst. *M. Beigelman.*

Raverdino, Emilio. **A simple method of dacryorhinostomy by introduction of a rubber tube into the tear sac.** *Klin. M. f. Augenh.*, 1930, v. 84, May, pp. 685-691. (2 ill.)

The method differs from others in that the tear sac is not extirpated, but is slit in the whole length of its inner wall along the sulcus of the lacrimal bone. A rubber tube is introduced and sewn to the walls of the sac. On account of the drainage the wound heals without suppuration, the functional and esthetic effects are very good, and the time of operation shortened. The technique is described in detail and the special instruments required are illustrated. Forty-two patients were operated upon in this fashion.

*C. Zimmermann.*

Safar, K. **Alcohol injection in the treatment of blepharospasm and spastic entropion.** *Zeit. f. Augenh.*, 1930, v. 71, May, p. 135.

The author found alcohol injection to be a simple and effective procedure which in his hands relieved two patients with blepharospasm and two with spastic entropion. He injects 2 to 3 c.c. of eighty percent alcohol into the deep muscular tissue at the temporal orbital margin, preceded by an equal quantity of four percent novocain.

*F. H. Haessler.*

Solovieva, M. K. **On the question of aniline dyes in the treatment of blepharitis.** *Ukrainskii Oft. Jour.*, 1929, v. 1, pt. 2, pp. 75-80.

In the above article the author describes the clinical observations made in the systematic treatment of ulcerative blepharitis with aniline dyes at the Hirschmann Ophthalmic Hospital. On the basis of his observations the writer feels justified in coming to the following conclusions: (1) Solutions of brilliant green and malachite green possess bactericidal properties and can render valuable services in the therapy of ul-

cerative blepharitis. (2) Because of the cheapness and accessibility of aniline dyes they can have a general wide application. (3) There is very slight difference in the action of brilliant green and malachite green on the inflammatory process. *Joseph I. Gouterman.*

Stein, Richard. **Blepharochalasis of the lower lid.** *Klin. M. f. Augenh.*, 1930, v. 84, June, p. 846.

Typical blepharochalasis with atrophy of the skin, relaxation of the fascia, ectasia of the subcutaneous vessels and prolapse of orbital fat and the lacrimal gland has so far been observed only in the upper lid. In the last two years two patients attended the El-schnig clinic who were found to have this anomaly in the lower lid. The changes were in no way atypical except for location.

*F. Herbert Haessler.*

Taratin, P. **A new treatment of epiphora.** *Klin. M. f. Augenh.*, 1930, v. 84, May, pp. 679-685. (2 ill.)

For cases of epiphora which cannot be relieved by any kind of treatment, Taratin recommends injections of alcohol, from seventy to ninety percent, into the palpebral lacrimal gland as far as to the bone of the orbit. As shown in his experiments on young dogs, the alcohol produced atrophy of the gland by mechanical destruction and compression of the tubules. Of the thirty-one patients treated with alcohol injections, six had no tear sac, fifteen had dacryostenosis, five had cicatricial injury of the lacrimal passages, two had nasal deformity, and three had increased irritability of the lacrimal gland. The histologic changes caused in the lacrimal gland by alcohol are illustrated.

*C. Zimmermann.*

Wurde mann, H. V. **Anatomy, physiology and pathology of the lacrimal apparatus, more especially of the lacrimal sac and duct.** *Canadian Med. Assoc. Jour.*, 1929, v. 21, Dec., p. 670.

Diseases of the lacrimal gland are few and are practically limited to adenitis and tumors. Anomalies of the lacri-

mal passages, however, are common and are almost always associated with disease of the conjunctiva, nose, or sinuses.

Aside from syphilis or tuberculosis, an obstruction to the lacrimal passages is the first thing that causes disease of the sac. Foreign bodies and congestion of the mucous membrane are the most frequent causes of obstruction. Bony obstruction is rare. Accessory sinus disease may be, but rarely is, a cause of lacrimal disease. Changes in the nose which obstruct the lower end of the canal are frequent causes of dacryocystitis.

Nasal treatment is indicated in addition to conservative ophthalmological measures such as syringing and dilating. Radical surgical procedures should be reserved for those cases in which drainage cannot be obtained by these treatments. The author recommends complete removal of the diseased lacrimal sac, if possible, with drainage through into the nose.

*Maurice Marcove.*

## 15. TUMORS

Belfort, Fabio. **A case of tumor of the optic nerve with extension into the cranium.** *Annaes de Ocul. de Rio de Janeiro*, 1930, v. 2, June, pp. 223-238.

This case was in a female, aged fifty-six years, who had had some pain and blurring of vision in the right eye for some fifteen years. She noticed a gradual protrusion of the eyeball for three years previous to medical consultation. The eye was blind and proptosed 34 mm. A hard tumor mass was felt deep in the inferior part of the orbit. The nerve head was atrophied. The vision in the left eye was about 4/200. There was a patch of chorioretinitis present next to the nerve head at the nasal side superiorly. Atrophy of the nerve head was present. No symptoms of intracranial involvement were present. A diagnosis of tumor of the optic nerve was made.

Operation was undertaken and the tumor mass removed which proved to be an endothelioma. The patient was making an apparently good recovery

when she suddenly died on the thirteenth postoperative day of chronic myocarditis.

Postmortem examination revealed an extension of the mass into the cranial cavity involving the entire prechiasmal portion of the nerve on the right side. (Two illustrations.) *H. L. Lucic.*

Berberov, R. G. **On primary sarcoma of the iris.** *Russkii Ophth. Jour.*, 1930, May, pp. 650-656.

Four cases of sarcoma of the iris are reported. The author stresses the fact that in all of them the origin of the sarcomata could be traced in pigmented nevi of the iris. This, however, was established from case histories and not through personal observation. In one case the malignant degeneration of melanomata was confirmed on histopathologic examination, for near the main tumor mass some pigmented nevi were found, which had penetrated deeply into the iris tissue, and which were surrounded by typical sarcomatous cells. *M. Beigelman.*

Cresswell, T. H. and Briggs, W. A. **Hemangioma of the orbit.** *Brit. Jour. Ophth.*, 1930, v. 14, July, p. 357.

This is the report of a female, aged twenty-six years, who presented the evidence of an orbital new growth. Active symptoms were of two years' duration. There was a history of injury at the age of nine years. The mass, about the size of a strawberry, was easily removed with the fingers. Sections showed communicating spaces lined with endothelium and filled with blood corpuscles. *D. F. Harbridge.*

Del Duca, M. **Cylindroma of the orbit.** *Ann. di Ottal.*, 1930, v. 58, April, p. 319.

The author reports a case of recurrent tumor of the superior external angle of the right eye, that, from its clinical character and its histological findings, should be included in the group of cylindroma of Billroth. After a minute report of the characteristic histology of this neoplasm the author concludes that the tumor cells are of

endothelial origin and that the cellular development arises from the hyalin substance which is abundant in the growth. *Park Lewis.*

Del Duca, Mario. **A study of the contents of an orbit exenterated for retrobulbar sarcoma (clinical case).** *Ann. di Ottal.*, 1930, v. 58, April, p. 329.

After a brief review of the bibliography the author reports a case of small-, round- and fusiform-celled sarcoma, originating in the loose connective tissue of the left orbit of a child of five years. After having described the tumor histologically he studies the behavior of the ocular muscles and of the sclerotic as they became invaded. He concludes that the propagation of the tumor was through the continuity of the muscular structures and by way of the blood vessels in the sclera. The remaining orbital structures were not involved (lacrimal gland, optic nerve, periosteum, conjunctiva), but there was intense phlogosis due to intense infiltration of leucocytes and lymphocytes, with which the turgid vessels were filled. *Park Lewis.*

Golovine, S. S. **Concerning the diagnosis and operative treatment of orbital tumor.** *Ann. d'Ocul.*, 1930, v. 167, June, pp. 457-526.

This is a treatise which was to have been presented at the International Congress at Amsterdam.

The diagnosis of orbital tumors is the first division. This includes symptoms, with sixteen subdivisions. Golovine then discusses the causes and the different types of tumors. He describes operative methods, preferring a modified Krönlein in most cases. For pulsating exophthalmos he ligates the carotid and also resects the inferior ophthalmic vein. He then describes operations for tumors of the neighboring sinuses involving the orbit. Many cases and illustrations by photographs and drawings are given.

A bibliography of forty articles by the author on orbital conditions is appended. *Lawrence T. Post.*

Jaensch, P. A. **The prognosis of enucleation in melanosarcoma of the uvea.** *Klin. M. f. Augenh.*, 1930, v. 84, May, pp. 649-662. (2 ill. 4 curves.)

Jaensch reports on sixty-four intraocular sarcomas at the eye clinic of the University of Breslau. So far thirty-five cases had shown no metastasis. The best results were obtained if enucleation was performed as early as possible. Only in three out of the sixty-four cases (three percent) did orbital relapses occur after enucleation. The material does not allow a definite decision as to whether enucleation or exenteration of the orbit deserves preference. Several cases showed that in spite of perforation enucleation may yield good results. The clinical histories of patients affected with metastasis showed that other operations had rather frequently been performed previous to enucleation and had perhaps a detrimental influence. Hence diagnostic puncture is warned against, especially since it does not always give unequivocal results. Improved diasceral illumination may supplant it. The author adheres to early enucleation in merely intraocular tumors or if the sclera is invaded. In cases of perforation, if only microscopically proved, orbital exenteration is advised. *C. Zimmermann.*

Ranzi, E. **Surgery of brain tumors and its results.** *Arch. f. Augenh.*, 1930, v. 103, June, pp. 92-110.

The author reviews the results of a series of brain tumor cases treated by surgery. It cannot be emphasized too much that the choked disc is the unquestioned urgent indication for surgery. It would naturally be wrong to wait for a reduction of vision. This reduction often takes place so rapidly that irreparable damage is done, for the vision is not restored by any surgical procedure. *Frederick C. Cordes.*

Terrien, F. and Charamis, J. **Concerning tumors of Rathke's pouch.** *Arch. d'Opht.*, 1930, v. 46, June, p. 337.

This rather voluminous paper presents one case of a tumor derived from rests of the craniopharyngeal canal in

a thirty-six-year-old woman. Two similar cases from the literature, and three cases of such tumor cured by operation by Clovis Vincent, are described. One case, in a fourteen-year-old child, diagnosed by the writers as a tumor of Rathke's pouch, was treated by another surgeon by decompression and radium therapy, after which the child died of hyperpyrexia. The success of operative intervention on these tumors is directly proportional to the earliness of their diagnosis. The most characteristic finding which is diagnostic of a tumor of Rathke's pouch is the presence of calcified areas in the radiograph of the tumor.

*M. F. Weymann.*

#### 16. INJURIES

Altschul, Walter. **Clinical experience with my method of roentgenologic localization of an intraocular foreign body.** *Klin. M. f. Augenh.*, 1930, v. 84, June, p. 838.

The method depends on the use of a corneal marker and on five exposures with the eye looking forward, then up, down, nasal, and temporal at thirty degrees with the sagittal axis of the eye. From measurements taken and the help of elaborate tables one can determine the center of rotation of the eye and the nearest superficial point to the foreign body, as well as its location in the eyeball. Among forty-nine cases of intraocular foreign body there were twelve which could serve to test the value of the method. In these, the foreign body was either nonmagnetic or so located that simple application of a magnet was ineffectual. In nine of these twelve cases the foreign body was instantly found at operation. In two of the three remaining cases the calculations had been incorrectly made in the author's absence, and in one case the foreign body, which was calculated to be within the bulbus, had actually become lodged in the superior oblique muscle. *F. Herbert Haessler.*

Bretagne, P. **Corneal accidents in the newborn produced by too concentrated silver nitrate solution.** *Bull. Soc. Franç. d'Opht.*, 1929, v. 42, p. 279.



Bretagne reports a severe unilateral corneal inflammation occurring in an infant six days after normal birth. There was marked injection of the globe with diffuse infiltration of the cornea more marked in the lower half. After fifteen days the condition cleared so that only a light opacification of the lower half of the cornea remained. The silver nitrate solution was immediately suspected and upon examination found to be seven and five-tenths percent. Use of this solution in the eyes of newborn rabbits produced experimental corneal lesions almost exactly comparable to that observed in the reported case. The fact that one eye alone was involved could be explained only by the failure of the attendants to use the solution in the other eye at birth.

*Phillips Thygeson.*

Bulac, C. O. **Perforation of the cornea by a stone splinter.** *Zeit. f. Augenh.*, 1930, v. 71, May, p. 165.

A rather large fragment of stone which had lacerated the cornea became embedded in the iris. It was surgically removed three months after the injury. The eye healed completely with a rather large scar.

*F. H. Haessler.*

Cavka, V. **Electric cataract with cyclitis.** *Zeit. f. Augenh.*, 1930, v. 71, May, p. 156.

A thirty year old man was exposed to a 220 volt electric current and rendered unconscious for several minutes. Five months later he was injured in a short circuit when a spark jumped to his body while holding a pole in his hand. Ten days later his vision became cloudy in his left eye. A cataract and cyclitis had developed. After a study of the literature the author assumes that the lens and the ciliary body had each been injured directly by the electricity.

*F. H. Haessler.*

Comberg, W. **The technique of diasceral magnet operation.** *Klin. M. f. Augenh.*, 1930, v. 84, June, p. 817.

The author insists on accurate localization. Comberg dissects up a con-

junctival flap and then with a sharp knife traverses all coats of the eyeball with a single curvilinear incision as near the foreign body as can be determined by actual measurement. He then inserts the tip of the magnet sufficiently deep so that the foreign body, which will be attracted to its tip, need only traverse retinal or choroidal tissue radially.

*F. Herbert Haessler.*

Cridland, B. **Minor injuries to the eye in industry.** *Brit. Med. Jour.*, 1929, v. 2, Oct. 5, p. 615.

Analysis of 426 cases of minor eye injuries revealed the fact that ninety percent were foreign bodies on the cornea, five percent were abrasions of the cornea, and five percent were miscellaneous (burns of the lids, wounds of conjunctiva, contusions of the globe). Protective measures were not used in seventy percent of the cases. A rough estimate of the time lost from work was 992 hours, or 124 working days of 8 hours each, due to 426 cases of minor injury. It is pointed out that minor eye injuries have an appreciable importance in industry; the need of prevention, in the form of mechanical guarding, education, and engineering revision is emphasized.

*George H. Stine.*

Litinsky, G. A. **Injuries to the surface of the eyes from the standpoint of functional asymmetry.** *Russkii Ophth. Jour.*, 1930, May, pp. 617-630.

In a series of two hundred and eleven cases of corneal and conjunctival injuries, the dominant eye was found to be more frequently affected. In patients with a functional predominance of the right eye, the right eye injuries constituted eighty-nine percent; in the left-eyed patients, the dominant eye was affected in nearly sixty-three percent of all cases. This particular vulnerability of the leading eye is due, in the author's opinion, to less frequent and incomplete palpebral closure of the functionally dominant eye as compared with similar protective reflexes in the nondominant eye.

*M. Beigelman.*

Schläpfer, H. **Investigations on the emission curve of glowing glass in a glass factory.** *Klin. M. f. Augenh.*, 1930, v. 84, May, pp. 663-671. (2 ill.)

The investigations, which are described in detail, showed the fact, hitherto not experimentally established, that the maximal intensity of emission from molten glass lies at 2000 millimicra, abruptly declining to 1000 millimicra and then gradually to the red waves; so that visible light and ultraviolet have no practical significance in comparison with the short-waved ultrared. This confirms the results obtained from experiments made at Vogt's clinic, namely that the ultraviolet of the arc lamp and of the high intensities of the mercury vapor lamp, even upon long exposure, cause no opacities of the lens, whereas such opacities are caused by the ultrared from the arc lamp. The more permeable a medium is for a certain radiation the less it is damaged by it. Hence it is probable that visible light even at highest intensity cannot injure the lens, because it readily penetrates it, but does injure the pigment epithelium by which it is absorbed, and consequently exerts thermic and chemical actions.

C. Zimmermann.

Waardenburg, P. J. **Refraction and research as to twins.** *Klin. M. f. Augenh.*, 1930, v. 84, May, pp. 593-637.

The importance of research as to twins for medicine in general and for refraction is that uniovular twins are the only human individuals who are entirely equal with regard to heredity. Waardenburg presents the results of investigations of refraction on 137 uniovular and 55 binovular pairs. The striking similarity of the uniovular twins for every state of refraction is shown. It renders the author sceptical as to any theory which assumes a great plasticity of refractive predisposition and dependence of refraction upon the external influences to which every one is more or less subjected.

C. Zimmermann.

## 17. SYSTEMIC DISEASES AND PARASITES

Bargy, Maurice. **Ocular complications of dengue fever.** *Bull. Soc. Franç. d'Opht.*, p. 293.

Bargy noted only four ocular complications in the several hundred cases of dengue that he had seen over a period of seventeen years. These were: two cases of corneal herpes, one case of paralysis of the third nerve, and one case of retrobulbar neuritis. All terminated in complete healing.

Phillips Thygeson.

Kyrieleis, W. **Arteriosclerosis of the retina, choroid, and optic nerve, and its influence on albuminuric retinitis.** *Arch. f. Augenh.*, 1930, v. 103, June, pp. 160-198.

Arteriosclerosis of the inner coats of the eye and optic nerve was found in each of six cases of contracted kidney with renal arteriosclerosis. It was not present in one case of arteriosclerotic contracted kidney that was complicated by bilateral axial neuritis of unknown etiology. The distribution of the arteriosclerosis or its intensity have no etiological significance in albuminuric retinitis. The disturbance of circulation seems to be associated with increased blood volume in the peripheral circulation. Frederick C. Cordes.

MacCallan, A. F. **Toxic absorption due to focal septic lesions: its effects on the production of eye diseases.** *Brit. Med. Jour.*, 1929, v. 2, Nov. 23, p. 943.

In adults the most usual site of focal sepsis is the mouth, while in children it is the tonsils. Less frequently, in the author's experience, it is in the intestinal tract, especially the appendix, and sometimes in the colon or duodenum. Also, the gallbladder, the female pelvic organs, the deep urethra and prostate, or any chronic form of sepsis may be the existing cause.

Dental disease may be classified as follows: (1) pyorrhea, (2) apical abscesses, the frequency of which is not yet realized by the medical profession,

(3) septic stumps of teeth, (4) buried fragments of previously extracted teeth, (5) unerupted impacted teeth, usually the third molars, sometimes the upper canines, and (6) residual sepsis or bone infection, indicated by the x-ray. Extraction of teeth in such conditions should be ordered only upon the advice of the dental surgeon.

The association of severe dental sepsis with unmistakable ocular changes may be a coincidence, but the author believes it to be constant. Foci of infection cannot be differentiated one from another by the ocular effects.

There are three paths by which the products of focal sepsis may reach the eye. The first is by direct extension, the second by lymphatic absorption, and the third by deglutition and then absorption of products of tonsillar and dental sepsis through the alimentary tract.

Blepharitis, acute and chronic inflammation of meibomian glands, ordinary conjunctivitis, phlyctenular conjunctivitis, episcleritis, corneal ulcer, dacryocystitis, and orbital cellulitis are examples of effects of direct extension. Lymphatic absorption from closed dental sepsis, chronic tonsillitis and other chronic inflammations may produce, in addition to the above mentioned conditions, iritis, cyclitis, some forms of choroiditis and retinitis, embolism and thrombosis of the central retinal vein or one of its branches. The author has no doubt that acquired nontraumatic cataract has its inception in focal sepsis. Deglutition of septic material and its absorption from the intestinal canal may cause the same ocular lesions as mentioned above.

The writer concludes that his personal experience proves the association of focal sepsis with blepharitis, meibomian cyst, corneal ulcer, iritis, choroiditis, retinitis, cataract, primary glaucoma, and progressive myopia.

*George H. Stine.*

**Rollet. The extirpation of a hydatid cyst of the orbit by subaponeurotic orbitotomy.** Arch. d'Opht., 1930, v. 47, May, p. 296.

A case is reported of a man aged twenty-five years who had a marked exophthalmos of the right eye. Exploration by the subaponeurotic method showed a tumor which was excised and found to be a hydatid cyst. Attention was called to the advantage of this method of approach, as by it the contents of the orbit are not damaged and the cyst is easily located.

*M. F. Weymann.*

**Sauer, L. Combined disturbance of accommodation and convergence in encephalitis.** Zeit. f. Augenh., 1930, v. 71, May, p. 141.

The author reports his findings in a patient who had paresis of accommodation and convergence, spastic vertical ocular deviation and anisocoria, all associated with encephalitis. He discusses some neurological problems suggested by some of these manifestations. There is no subcortical center for near work controlling the centers of accommodation and convergence. These centers lie very near together and are probably median nuclei situated immediately in front of and slightly dorsal to the tip of the nucleus of the third cranial nerve. The spastic deviation results from irritation of the posterior longitudinal bundle, probably an injury of the fibers that leave the anterior corpora quadrigemina.

*F. H. Haessler.*

**Villard, H. Ocular complications of malaria.** Arch. d'Opht., 1930, v. 47, April, p. 200.

In the anterior segment of the eye one finds a slight conjunctivitis at times as a complication of malaria, but it usually needs no treatment. A superficial keratitis of the dendritic type is often found in the acute stage of malaria, particularly in nonmalignant cases. A deep keratitis, found in the severe cases with cachexia, is characterized by a deep infiltration of the cornea which usually results in a permanent diminution in vision. True malarial iritis is rare. Hemorrhages into the vitreous are uncommon but when they occur they absorb slowly. Infiltrations into

the vitreous have been described which absorb after quinine therapy. Chorioiditis is not uncommon but may be only recognizable with the microscope. Spasm of the retinal vessels and hyperemia have been described. Retinal hemorrhages are not rare especially in cachectic types, and the larger hemorrhages situated near the posterior pole are particularly likely to interfere with vision. Retrobulbar neuritis is rather exceptional. Optic neuritis with papillitis is not so uncommon; it varies with the phases of the malarial infection. The disc shows a peculiar melanosis in its intermediary portion which is characteristic. Optic atrophy is never primary, but frequently follows the neuritis. Trigeminal neuralgia has been reported in malaria. The treatment of those ocular lesions due to malaria is the use of quinine in addition to local measures. *M. F. Weymann.*

#### 18. HYGIENE, SOCIOLOGY, EDUCATION AND HISTORY

Bartels, Martin. **Schools for children with poor vision.** *Klin. M. f. Augenh.*, 1930, v. 84, May, pp. 637-648.

Particulars of the existing schools in different countries are given. The author especially emphasizes that children with poor vision are not blind and can only be properly cared for by appropriate education in special schools.

*C. Zimmermann.*

Comberg, W. **A new system of hospital records for scientific utilization of material in the eye clinic of the University of Berlin.** *Klin. M. f. Augenh.*, 1930, v. 84, May, pp. 698-702. (4 ill.)

Description of the system is supplemented by illustrations of lists of diseases arranged anatomically and cards issued to the patients, and it has been tried at the eye clinic of Berlin very successfully. It saves time and facilitates the finding of material for scientific research. *C. Zimmermann.*

Evans, J. J. **Blindness in old age.** *Brit. Med. Jour.*, 1929, v. 2, Nov. 9, p. 847.

The causes of blindness in old people (700 consecutive cases under the Blind Persons Act) were analyzed as follows: cataract 205, optic atrophy 78, glaucoma 75, iridocyclitis and keratitis 54, corneal opacities 45, retinitis pigmentosa 43, chorioretinal atrophy 42, congenital defects 33, retinal detachment 27, myopia 20, phthisis bulbi 17, chorioretinal vascular disease 14, diabetes 12, ophthalmia neonatorum 9, sympathetic ophthalmia 9, trachoma 9, buphthalmos 5, and injury (double) 3.

*George H. Stine.*

Litinsky, G. A. **Injuries to the surface of the eyes from the standpoint of functional asymmetry.** *Russkii Opht. Jour.*, 1930, May, pp. 617-630. (See Section 16, Injuries.)

Ohm, J. **Legal aspects of miners' nystagmus.** *Zeit. f. Augenh.*, 1930, v. 71, June, p. 226.

A general experience in ophthalmology does not by any means qualify one for expert opinion in cases of miners' nystagmus. The technique of examination is very complex. Many workers afflicted with nystagmus work for years until a strike, decreased pay, a quarrel with the foreman, or other external cause induces them to give up work. This does not mean that the disease is not serious. Continuous nystagmus is a torment, and it takes great patience and self-discipline to do work which is apt to increase the affliction.

Industrial nystagmus differs from congenital nystagmus in that the patient is aware of false movement and of dissociated characters, and the oscillations are in opposite directions in the two eyes. This destroys binocular single vision and reduces central visual acuity. The degree of nystagmus is influenced by position of the head, eyes, and body. The author believes that a worker is entitled to compensation when nystagmus occurs with gaze directed forward on the level of the eye, and when the visual acuity is reduced. The test must be made in daylight with the patient quiet and in an erect



posture. The amount of compensation will still give rise to endless discussion.

*F. H. Haessler.*

Patry, André. **Medical examination of automobilists.** *Arch. d'Opht.*, 1930, v. 47, May, p. 304.

There is considerable doubt expressed by government authorities and insurance companies as to whether elimination of physically unfit drivers by medical examination has much effect on the accident rate. The psychic factors seem to play a more important part in producing accidents than physical disabilities. Fatigue and adverse weather conditions cause many physically fit drivers to become dangerous. However, the signing of a preliminary declaration that one is physically fit to drive an automobile (with the stipulation that should he have an accident and then be found physically unfit, his license to drive will be revoked) should have a beneficial psychological effect

on drivers of automobiles. The knowledge that their license will be revoked if they have an accident will make the physically unfit drivers tend to take fewer risks and to be much more careful in their conduct.

*M. F. Weymann.*

Sorsby, Arnold. **On the nature of Milton's blindness.** *Brit. Jour. Ophth.*, 1930, v. 14, July, p. 339.

This is a discussion of the various theories which have been suggested in explanation of Milton's blindness. The principle causes suggested are glaucoma, detached retina, congenital syphilis and albinism. In view of the fact that Milton's parents both had defective vision, together with facts gleaned from his habits, and statements in his writings, the author finds that the evidence favors the theory that his blindness was due to the complications of myopia.

*D. F. Harbridge.*

## NEWS ITEMS

News items in this issue were received from Drs. E. D. LeCompte, Salt Lake City; and Charles P. Small, Chicago. News items should reach **Dr. Melville Black**, Metropolitan building, Denver, by the twelfth of the month.

### Deaths

Dr. Luther Colby Rood, Boston, aged fifty-three years, died June twenty-seventh, of heart disease.

Dr. William Jacob Rideout, Freeport, Illinois, aged sixty-one years, died July twenty-fifth, of heart disease.

Dr. Walter Eyre Lambert, New York, aged seventy-one years, died July twenty-eighth, at Murray Bay, Quebec.

Dr. Walter E. Murphy, Cincinnati, aged fifty-nine years, died suddenly August fourth, of cerebral hemorrhage.

Dr. Edmund Towle Brown, Burlington, Vermont, aged fifty-eight years, died June fourth, of arteriosclerosis with coronary thrombosis.

### Miscellaneous

The Virginia legislature, at its 1930 session, passed measures making compulsory the education of all deaf and blind children in the state, and authorized local school authorities of cities and counties to establish and maintain special classes for the education of blind and partly blind children in public schools in cooperation with the Virginia Commission for the Blind.

According to the Director of Public Health, ophthalmia neonatorum is fifteen times more prevalent for every thousand new-born babies in Illinois than in New York, eleven times more than in Missouri, and six times more than in Pennsylvania. The law in all of these states concerning the furnishing of free prophylactic solution and the reporting of cases of ophthalmia neonatorum is the same, but in the states of Pennsylvania, Missouri, and New York the law compels all physicians and midwives to instil the solution into the new-born babe's eyes, while in Illinois the law is simply permissible, with no penalty attached for failure. It appears that not less than thirty-four children in Illinois have been rendered blind from this cause during the last seven years, and the state is now paying out more than \$1,000,000 to support 4,500 blind pensioners, many of whom were blinded as the result of this preventable disease.

The Ophthalmic Publishing Company has issued invitations to a dinner for its stockholders, collaborators, and editorial board,

to be held at the University Club, Chicago, at six p.m. on October thirtieth, during the meeting of the American Academy of Ophthalmology and Otolaryngology.

### Societies

The annual session of the Pacific Coast Oto-Ophthalmological Society was held at Victoria, British Columbia, September 3 to 5.

The American College of Surgeons will hold its twentieth clinical congress in Philadelphia October 13 to 17, at the Bellevue-Stratford Hotel. Among the foreign guests will be Professor Emil de Grosz, Budapest, Hungary, who will talk on ophthalmic surgery.

The twentieth annual meeting of the Oxford Ophthalmological Congress was held in Oxford July 10 to 12, with 149 members present. Addresses were given, among others, by Sir Oliver Lodge on "Modern theories on the nature of light"; Professor Schüller of Vienna on "Recent developments in radiology associated with ophthalmology"; and Professor Jules Gonin of Lausanne on "Detachment of the retina and its treatment".

To celebrate the jubilee of the Ophthalmological Society of the United Kingdom, the Council of the Société Française d'Ophthalmologie has elected Mr. Leslie Paton, president of the Ophthalmological Society of the United Kingdom, to be an honorary member of the French society.

### Personals

Dr. F. Leaver Stauffer and wife of Salt Lake City spent the summer in Europe.

Dr. Walter S. Franklin, clinical professor of ophthalmology at the University of California, has been granted leave of absence for the year 1930-1931.

The Knapp medal of the Section on Ophthalmology of the American Medical Association was awarded this year to Dr. Arthur J. Bedell, of Albany, New York, for his paper on "The significance of some changes in the ocular fundus". The committee making the award probably had in mind Dr. Bedell's valuable contributions to ophthalmology through the meetings of the Section in previous years.